

Senior Transportation Officer Qualification Course Lighterage - JLOTS

Motivator

During a protected contingency operation, strategic sealift transports 90 percent of the supplies and equipment required by operating military forces.

The strategic sealift ships transport supplies and equipment to a conflict area and discharge either at ports with fixed facilities or at unimproved beach locations, through Joint logistics-over-the-shore (JLOTS) operations.

Army water transport units provide watercraft to support:

- Port
- Inland waterway
- JLOTS
- · Intratheater movement operations

As a Senior Transportation Officer you must be able to plan for moving supplies and equipment from the sealift ships over the beach and to the end user in the shortest time possible.

Army water transport units provide watercraft to support port, inland waterway, and JLOTS, and intratheater movement operations.

As a Senior Transportation Officer you must be able to plan for moving supplies and equipment from the sealift ships over the beach and to the end user in the shortest time possible.

This lesson will provide you with the basic planning factors to accomplish this mission.





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Objectives

Action:

Identify the concepts, principles, and characteristics of Lighterage in JLOTS Operations.

Condition:

In an environment configured for Interactive Multimedia Instruction (IMI).

Standard:

Identified the concepts, principles, and characteristics associated with Lighterage in JLOTS Operations currently employed for improvement in the U.S. Force Projection effort within the Operational Environment.





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Lead-in

Logistics over-the-shore (LOTS) is the process of discharging cargo from vessels anchored off-shore or inthe-stream, transporting it to the shore and/or pier, and marshalling it for movement inland.

LOTS operations are conducted over unimproved shorelines, through fixed-ports not accessible to deep draft shipping, and through fixed-ports that are inadequate without using LOTS capabilities.

Both the Army and Navy may conduct LOTS operations, and the scope of the LOTS operations will depend on geographic, tactical, and time considerations.

Joint logistics over-the-shore (JLOTS) operations are defined as operations in which Navy and Army LOTS forces conduct LOTS operations together under a joint force commander (JFC).

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Organization and Command of JLOTS Operations

Forces assigned to conduct the JLOTS operation are organized by the Joint Forces Commander (JFC).

The JLOTS forces are normally organized along functional lines, with Service elements integrated under the tactical control (TACON) of the JLOTS commander.

Combatant commanders have overall responsibility for JLOTS operations in their area of responsibility.

The combatant commander may delegate responsibility to subunified commanders or joint task force commanders in the conduct of their assigned missions.

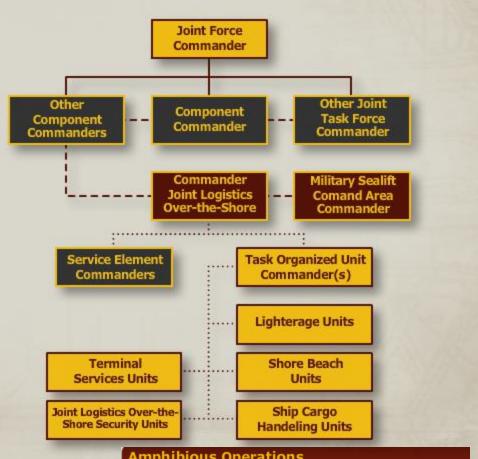
The United States Army, Navy, Marine Corps, and the Coast Guard have personnel and equipment necessary for the conduct of LOTS operations.

The delegated commander or JLOTS commander is responsible for detailed planning and execution of JLOTS off-load operations. JLOTS operations frequently follow amphibious operations,

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Amphibious Operations

An amphibious operation is an attack launched from the sea by naval and landing forces embarked in ships or craft involving a landing on a hostile or potentially hostile shore.

Forces assigned to conduct an amphibious operation are organized as an amphibious task force or a joint amphibious task force.



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In many places that the Army could be called on to operate, there will not be the industrial fixed ports that have been enjoyed in past wars.

In these instances and cases of damaged ports, a JLOTS operation will be the only way to increase the cargo throughput, ensuring the delivery time lines and moderate the risk to the warfighter.

The specific functions and advantages of JLOTS are:

- Supports Beachhead Operations
- Increase Throughput
- · Used in absence of fixed port
- Replaces inadequate or destroyed fixed ports
- Can be used for Supplemental Throughput
- Reduces land transportation distances

Planning a JLOTS Operation



"In war nothing is achieved except by calculation. Everything that is not soundly planned in its details yields no result."



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Planning for JLOTS operations is complicated by the need for detailed coordination between the various Service forces involved, the complex logistic activities, joint command relationships, geographic distance between ships and marshalling yards, and other peculiar operational factors.



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JLOTS Planning Considerations include:

- Tactical Environment
- Type of Operations to be supported
 - o Fixed Port
 - o Unimproved Port/beach
 - o Bare beach
- Type and Quantity of cargo (Load Planning) to be deployed and landed
- Types of ships to be worked and their arrival sequence
- Numbers and types of offload systems required
- Throughput Planning
- Anchorages
- Landing Sites
 - o Access to Beach
 - o Type of Beach
 - o Access to Infrastructure
- Sea state conditions and weather
- Geographic and hydrographic beach area natural obstacles
- Types of Holding Ground/Safe Haven
 - o Sheltered from Winds
 - o Sheltered from Currents



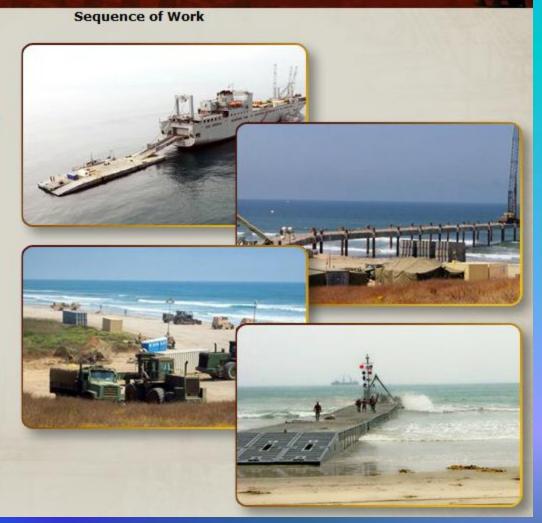
Listed here are planning considerations that are fundamental for the successful conduct of JLOTS operations.



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The Sequence of Work includes the following:

- Consider strategic sealift requirements necessary to deploy selected outsized military equipment needed to conduct over-the-shore operations for discharge or loading of designated ships.
- Deploy over-the-shore systems and equipment for sustained container, RO/RO, breakbulk, vehicle, and bulk fuel operations.
- Install and prepare over-theshore cargo transfer systems and equipment, i.e., RO/RO discharge facilities (RRDFs), elevated causeway piers, floating causeway piers, amphibian discharge sites, and beach and pier improvements.
- Transition, if necessary, from an amphibious operation to a LOTS or JLOTS operation.
- Manage and control movement of cargo in sustained operations over-the-shore.





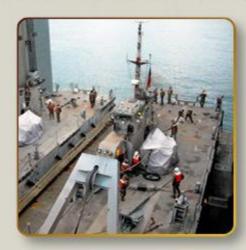
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Specific JLOTS Planning Considerations

There are specific JLOTS planning considerations which must be included in the planning process.

They are:

- Communications Planning
- Ship Discharge Plan
- Lighterage Repairs and Supply Support
- · Safe Haven plan
- Lighterage Availability and Utilization Plans
- Weather Support Plan
- Retrograde Cargo Operations
- Security Planning









Communications Planning

A communications plan for the effective interface of Service-unique communication systems in support of JLOTS operations must be developed.

JLOTS operations rely on both radio and wire communication for C2.

The primary forms of communication for control of lighterage will be bridge-to-bridge radio (voice) communications using equipment generic to the lighterage, radio telephone using communications satellite (COMSAT) and navigation satellite (NAVSAT), walkie-talkies (preferably with three to four frequencies), or cellular telephone.

Retrograde Cargo Operations

Eventually, repairable material for servicing out of country must be loaded on available shipping.

When the operation is over, units and supplies could be moved to a staging area for another operation, to the control of a Commander-in-Charge (CINC) with another area of responsibility (AOR), or to the continental United States.

Safe Haven Plan

A safe haven for both strategic vessels and lighterage should be designated. Normally, a safe haven is designated in amphibious assault operations.

Safe havens are specific Navy amphibious ships that have well decks and have the capability to provide this service and perform maintenance. These naval amphibious ships may not be available to support JLOTS operations that are conducted with strategic sealift ships.

Since most discharge equipment is weather-sensitive, safe havens must also be designated and a workable plan must be developed and disseminated, for safe haven use to ensure safe and effective JLOTS operations.

Lighterage Repairs and Supply Support

Planning must provide for the repair and maintenance of lighterage during the operation.

Lighterage Availability and Utilization Plans

The availability of lighterage by types, a generalized ship-to-shore movement plan, and procedures to be used in the event of inclement weather should be put into effect.

Weather Support Plan

"Sea State, Weather, and Surf," contains information on weather conditions. In selecting a landing site for JLOTS operations, the weather and effects of the sea play a key role.

Prior to selecting a site, planners should research historical weather conditions for that particular location or region.

During LOTS and/or JLOTS, continued cognizance of existing weather and surf conditions is imperative to the successful execution of a JLOTS operation.

Ship Discharge Plans

Discharge plans must be drafted as soon as possible after receipt of the ship's manifests and final stow plan from the Surface Deployment and Distribution Command (SDDC) and distributed to those units and individuals directly involved with throughput operations. The plans should be made available to other interested parties as required by the JLOTS commander.

Security Planning

The Joint Forces Commander (JFC) is responsible for overall security in the JLOTS area.

The JFC will determine host-nation security support availability and adequacy, if applicable, and will establish additional measures to provide security as required.

This responsibility may be delegated to a subordinate commander capable of providing adequate security.

Appropriate forces for security must be provided, depending on the threat and tactical situation, to protect the offshore area as well as the beach reception area.



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Throughput is the average movement of containers, wheeled vehicles, tracked vehicles, breakbulk cargo, and bulk liquid cargo that can pass through a port or beach daily.

It covers movement from arrival at the port or instream, to off-loading cargo onto lighters or piers, to the exit or clearance from bare beach or port complex.

Throughput is usually expressed in measurement tons (MTs) or square feet. Reception and storage may affect final throughput.

The JLOTS commander's goal, when planning for throughput, is to keep cargo continuously moving from the ships through the Marshalling yards to port complex exit.

Continuous movement of cargo is a key factor for efficient and effective throughput operations.

The major aspects of Throughput are:

- Throughput Planning Factors
- Throughput Rate
- Throughput Capacity

Throughput is the average movement of cargo and equipment that can pass through a port or beach daily.

It covers movement from arrival at the port or instream, to off-loading cargo onto lighters or piers, to the exit or clearance from bare beach or port complex.

Throughput Planning







Throughput Planning Factors

Throughput planning factors have been established for the lighterage systems used in JLOTS based on exercise demonstrations and are representative of achievable integrated off-load. Throughput is based on times necessary to execute the events of a JLOTS operation. Such events may include the following:

- · Cast off and clear time from the beach
- Transit time to the ship
- Approach and moor time at the ship.
- · Number of discharge points
- Load time at the ship
- Cast off and clear time from the ship.
- Transit time to the beach
- Approach and moor time at the beach
- Off-load time at the beach
- Clearance time for JLOTS operations area

Throughput Rate

A factor that determines the throughput rates is the capability of the lighterage; i.e., cargo type carried or weight capacity. Throughput rate is the quantitative measure of average daily movement of containers, wheeled vehicles, tracked vehicles, bulk liquid cargo, and breakbulk cargo that is moved from cargo ships, containerships, RO/RO vessels, and reverse osmosis water purification units (ROWPU) and tankers to marshalling yards or storage areas ashore

There are five distinct and continuous events that occur during throughput operations that impact the throughput rate:

- Ship cargo transfer
- Cargo movement from ship-to-shore (lighter transit time)
- · Beach cargo transfer
- Cargo movement (transit time) to marshalling yards
- Cargo clearance from port complex.

Training and effective C4 in these five events are key factors to sustaining throughput rates.

Throughput Capacity

Throughput Capacity is determined by the following factors:

- The number of suitable anchorages and maneuvering spaces available for off-load systems in the off-load area.
- Beach capacity is an estimate of cargo that may be unloaded over a designated strip of shore per day and depends on the number of ships that can be discharged at one time.
- Beach throughput depends on both the off-load and clearance rates. The off-load capacity rate is the rate cargo is discharged from lighterage. Beach throughput is a major consideration of JLOTS operations.
- Clearance capacity is an estimate of the cargo that may be transported inland from a beach or port over the available means of inland communication, including roads, railways, inland waterways, pipelines, and airheads. Clearance capacity includes the short tons of cargo and the number of containers and troops that can be moved daily from the beach or port complex to initial inland locations.



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Site Selection

Normally, the terminal commander, in early consultation with naval authorities, initially identifies possible beach sites, anchorage areas, and possible navigation difficulties for JLOTS operation.

The reconnaissance party must determine beach area characteristics and adequate anchorage to accommodate the number and types of ships required to support the planned beach operations.

A detailed ground and water reconnaissance of the selected area, extensive study of maps and hydrographic charts, and analysis of aerial reconnaissance reports determines the feasibility of operations at these sites.

Verification of Road net conditions shown on the map, such as new roads and bridges, may have been destroyed, or structures may have been built on the beach.

If anchorage areas are acceptable to the Navy, potential lighterage usage between the anchorage areas and the beach must be confirmed.

For example, sandbars or reefs just offshore may preclude the use of LCMs, LCUs, or barges in certain areas. They may also require the use of amphibians until a channel can be cleared.

The terminal commander, in consultation with naval authorities, initially selects possible beach sites for JLOTS operation by conducting an extensive study of maps and hydrographic charts and from an analysis of aerial reconnaissance reports.



A detailed ground and water reconnaissance of the selected area, as thorough as time and the situation permits, finally determines the feasibility of operations at these sites.

Naval authorities must be consulted early in the study so that advice about possible anchorage areas and difficulties and hazards to navigation will be available. as early as possible.



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Among the salient features to be considered for site selection are the following:

- Depth For large cargo ships, a mean low water (MLW) of 30 feet and a maximum of 210 feet are required. A Fast Sealift Ship (FSS) requires a MLW of 37 feet. The maximum draft of ships to be discharged dictate the minimum depth.
- Size For planning purposes, the anchorage area should be a circle with an 800 foot radius to provide a safe, free-swinging area. This is required for the standard five-hatch vessel.
- Landmarks Landmarks, especially those assisting navigation and location of beaches (such as prominent hills) are helpful.
- Underwater Obstacles These consist of bars, shoals,
 reefs, rocks, wrecks, and enemy
 installations that might interfere
 with the passage of vessels to
 and from the area.

Site Selection (cont.)







Among the salient features to be considered for sight selection are the depth of the anchorage, the size of ships to be anchored, landmarks that can be used as reference points for determining the anchorage sites, and what if any underwater obstacles may be present.



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Site Selection (cont.)

Factors to be considered in Site Selection are:

- Tide
- Surf
- Beach gradients
- Bars
- Characteristics of the bottom and beach surface
- Location and desirability of anchorage areas
- Weather
- Topographic features
- Engineering effort required to prepare and maintain an area
- Type of lighterage to be employed
- · Proximity to safe haven facilities
- Proximity and capacity of road and rail networks











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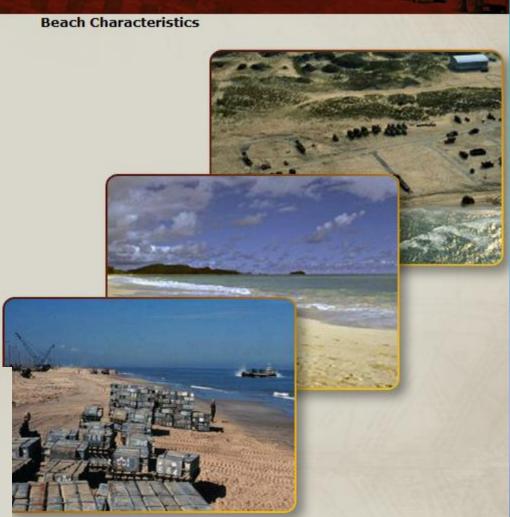
When selecting a specific area for beach operations, the following physical and environmental characteristics must be considered:

- Composition of the beach
- Beach gradient at various tide stages
- Length and width of beach
- Depth of water close inshore
- Tidal range and period (duration and variation of high and low water) effect of tides on the beach width
- Wind and weather conditions in the area

The ideal beach for landing craft and amphibian operations is one with deep water close to shore, a firm bottom of hard-packed sand and gravel, minimum variation in tides, and a moderate to gentle (1:15 to 1:60) underwater beach gradient.

It also has no underwater obstructions to seaward and no current or surf.

Although such a beach will rarely exist in the area of operations, the unit commander must weigh the characteristics of existing beaches against these desirable features.





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Calculating Beach Gradient

Beach gradient or underwater slope is usually expressed as a ratio of depth to horizontal distance.

For example, a beach with a water depth of two feet at 100 feet from the shore has a gradient of 1:50 (divide the horizontal measurement by the vertical to get the gradient) which indicates an increase in depth of 1 foot (.3048 meter) for every 50 feet (15.2 meters) of horizontal distance.

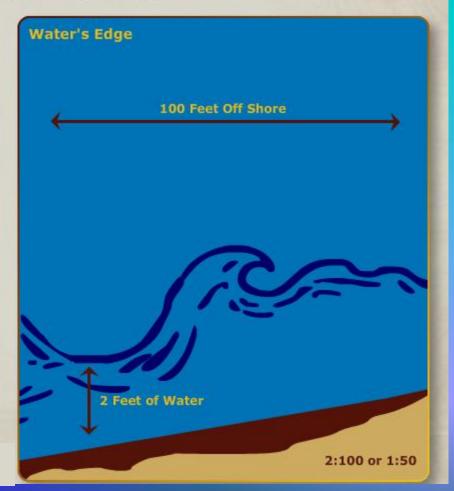
For landing operations, it is usually necessary to find the gradient only from the water's edge seaward to a depth of 18 feet/3 fathoms (5.5 meters).

Beach gradients are usually described as:

- · Steep (more than 1:15)
- Moderate (1:15 to 1:30)
- Gentle (1:30 to 1:60);
 Mild (1:60 to 1:120);
 Flat (less than 1:120)

Underwater gradients can seldom be determined from hydrographic charts.

Only a few areas have charts scaled larger than 1:100,000. Moreover, since the inshore seabed is subject to frequent change, only a very recent survey would have any value. However, there are ways to estimate gradient.



Steep

Steep beaches have gradients of more than 1:15. These beaches normally have plunging breakers; but if the gradient is very steep, breakers of an unusual type may exist.

In this case, water flowing down the beach fills the curling wave form with water and the breaker rolls over without impact, instead of plunging.

This type of breaking leads to swash flow up the beach with unusual velocity and height. Steep beaches tend to become steeper during a period of calm seas.

A summer berm advances outward and underwater berms and bars tend to disappear. Generally, steep beaches are composed of coarse sand particles, pea gravel, or gravel.

When waves break at an angle on steep beaches, currents are high. They exist throughout the surf zone and for some distance seaward.

Gentle, Mild, and Flat

Beaches with slopes of 1:30 to 1:300 have gentle, mild, or flat gradients. Plunging breakers are less common on these beaches; spilling breakers are the rule.

Plunging breakers are usually the result of a temporarily steep section of the profile. These beaches often have several bars. Where long period swells and short period waves exist, a certain amount of spilling takes place on the outer bar.

Spilling may obliterate the wind waves, and the swell may re-form behind the bar and plunge on one of the subsequent bars or the beach face. Unless partly protected, beaches of flat gradient usually have several offshore bars.

These beaches consist of fine sand. A pea gravel or gravel beach face is sometimes found at the mouths of small creeks. In channels between bars, currents may be very strong.

Moderate

Beaches with slopes of 1:15 to 1:30 are beaches with moderate gradient and are mainly composed of moderately fine sand. Plunging breakers are less common on these beaches.

Spilling breakers occur most frequently. The probability of each type of breaker depends on the topography of the beach and the type of waves that exist.

The moderate beach may have a gravel berm at extreme high water. Where a bar exists, currents are always present in the channel shoreward of the bar.

With waves parallel to the beach, these currents are low velocity. When breakers are at an angle to the beach, they may reach a velocity of 4 knots.

This flow normally follows the channel for some distance, and then flows out over the bar at low points 400 to 5.000 feet apart.

These partial channels are called rips, and currents flowing to sea maybe very strong. Where the beach face is steep, strong currents also exist in the inner surf zone.

When high waves exist, the bar becomes more pronounced and the beach face becomes flatter.

During a period of low waves, the beach face becomes steeper and the bar tends to disappear or become discontinuous. These beaches rarely have more than one bar.



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Anchorages

An ocean vessel can anchor in the stream or offshore. Inthe-stream anchor means the vessel is anchored in protected deep water, such as a harbor. Offshore anchor is an anchorage off the shoreline in unprotected deep water.

From either anchorage location, the ship can discharge to lighterage for subsequent discharge to a freed-port facility or to an unimproved facility or bare beach.

The following are critical items to consider for terminal and beach anchorages:

- Direction and true bearing from release point (RP) of all anchorages.
- Maximum/minimum depth for each anchorage. Depth of water at anchorage: 30 - 210 feet at MLW.
- Current speed and direction at each anchorage.
- · Radius/swing area of each anchorage.
- Bottom material and holding characteristic of each anchorage. Bottom composition - Best composition: Mud, mud and sand.
- · Exposure condition of each anchorage.
- Offshore and/or nearshore obstacles, what they are, and their distance and true bearing from port.
- Protected anchorage nearby for landing craft.
- Characteristics of sheltered anchorages for small craft and of adjacent beaches suitable for boat maintenance and bivouacs.

ANCHOR CIRCLE Depth of water = 37 Length of ship = 954' 100 Feet Off Shore 2 Feet of Water 2:100 or 1:50

An anchorage is a specified location for anchoring or mooring a vessel in-stream or offshore.

From either anchorage location, the ship can discharge to lighterage for subsequent discharge to a freed-port facility or to an unimproved facility or bare beach.

HURRAGE - JLOTS



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For military planning, ships anchor either offshore or in-the-stream (harbor). These formulas are used for military purposes so ships can get underway quickly.

Use the following formulas to determine the required size (diameter) of an anchorage site for a ship or the size of a ship that can be anchored at a specific swing site.

• Offshore: D = 2(7d + L)

• In-the-stream: D = R(4d + 2L)

Use the following formulas to determine the largest ship that will fit properly in a given swing area:

• Offshore: $L = \frac{D-7d}{2}$

• In-the-stream: $L = \frac{D - 4d}{D} / 2$

Where:

D = diameter

d = depth of water

L = length of ship

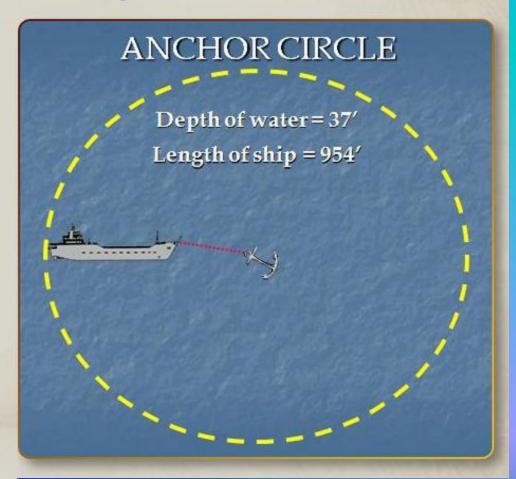
R = reserve factor (1.1)

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Use the following formulas to determine the required size (diameter) of an anchorage site for a ship or the size of a ship that can be anchored at a specific swips site.

Swing Areas



Offshore

Where:

d = depth of water is 37' L = length of ship is 954' R = reserve factor (1.1)

D = 2 (7d + L)

 $D = 2 ((7 \times 37') + 954')$

D = 2 (1213') D = 2426'

6076.12' per nautical mile

In the Stream

Where:

d = depth of water is 37' L = length of ship is 954' R = reserve factor (1.1)

D = R (4d + 2L)

 $D = 1.1 ((4 \times 37') + (2 \times 954'))$

D = 1.1 (148' + 1908')

D = 1.1 x 2056 D = 2261.6'

6076.12' per nautical mile

Determine Maximum Ship Length

Where:

D = diameter is 700' d = depth of water is 40'

Off Shore formula is L = D - 7d

 $L = (700' - 7 \times 40'')$

 $L = \frac{420'M}{2}$

L = 210'

In-the-Stream:

Where:

D = diameter is 700'

d = depth of water is 40'

R = reserve factor (1.1)

The In-the-stream formula is L = (D - 4d)/2

 $L = \frac{(700 - 4(40))}{1.1} / 2$

 $L = \frac{(700-160)}{1.1}/2$

L = (540)/2

L = 491/2

L = 246'



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Sea State

The Pierson-Moskowitz sea state scale provides a concise and sequential listing of both wind speed and sea states.

It should be used as the reference guide in determining the effect of wind speed on sea states.

The maximum operating sea condition is sea state three. However, throughput capacity suffers greatly after sea state two.

Conditions below sea state one are required for assembly and installation of a causeway system.

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Sea State	Significant Wave (ft)	Significant Range of Periods (sec)	Period of Maximum Energy (sec)
0	0.10	0.34 - 1.09	0.87
0	0.15	0.42 - 1.33	1.07
1	0.50	0.77 - 2.43	1.95
1	1.00	1.09 - 3.43	2.75
1	1.20	1.19 - 3.76	3.02
2	1.50	1.34 - 4.21	3.38
2	2.00	1.54 - 4.86	3.00
2	2.50	1.72 - 5.43	4.36
2	3.00	1.89 - 5.95	4.78
3	3.50	2.04 - 6.43	5.16
3	4.00	2.18 - 6.87	5.52
3	4.50	2.31 - 7.29	5.86
3	5.00	2.44 - 7.68	6.17

Frequency Maximum Energy (sec)	Average Period (sec)	Average Wave Length (ft)	Wind Speed (kts)
7.22	0.62	1.31	2.51
5.87	0.76	1.97	2.83
3.22	1.39	0.57	5.17
2.28	1.96	13.14	7.31
2.08	2.15	15.76	8.01
1.86	2.40	19.70	5.05
1.61	2.77	26.27	10.34
1.44	3.10	32.84	11.36
1.31	3.40	39.41	12.66
1.22	3.67	45.98	13.68
1.14	3.92	52.54	14.62
1.07	4.16	59.11	15.51
1.02	4.38	65.68	16.35



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Cargo operations in adverse weather conditions are negatively affected by sea, swell, and surf conditions. Local winds, thunderstorms, and reduced visibility are other environmental conditions that affect JLOTS operations.

In estimating the effects of weather on an operation, planners must consider the:

- Direction and speed of winds at the surface and in the upper air, the likelihood of storms, and the nature of storms typical to the target area.
- Distance at which objects can be seen horizontally at the surface and both horizontally and vertically in the upper air.
- Restrictions imposed on visibility by fog, haze, rain, sleet, or snow.
- Effect of extreme temperatures on personnel and materiel.
- Effect of excessive rain or snow on personnel and materiel.

Weather information concerning the offshore discharge area must be analyzed carefully to determine the probable effect of weather on lighterage operations and working conditions.

Frequent and accurate weather and surf forecasts are essential to the expeditious, efficient, and safe off-load of strategic sealift ships.

Weather











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Ocean waves arise as a result of local and offshore winds on the ocean surface.

Two types of surface waves are produced:

- Wind waves
- Swells

Wind waves and swell usually coexist in open water. Wind waves may completely obscure swell until near the shore where the swell peaks to a greater height.

This may be the first time the small craft operator becomes aware of the swell. Swell arising from distant storms approaches the coast at high speeds.

In the case of a large offshore disturbance, the swell usually arrives at the shoreline ahead of the storm. For this reason, vessels trying to reach harbors ahead of a storm may find the entrance impassable due to breaking swell.

Swells

Swells result from storms great distances from the coast. They are characterized by a long, smooth undulation of the sea surface. These waves never break in deep water, and time between successive crests may be very long.

Small craft in deep water are not affected by swell; however, swell does cause larger vessels to roll and pitch in deep water. In shallow water, swells increase in height.

Upon reaching a sufficiently shallow depth, swells may give rise to an immense surf that may damage shore installations or make harbor entrances impassable.

Surf



Wind waves are usually steep with a short time between successive crests. Frequently, the crests break in deep water. When crests are small, they are called whitecaps.

When crests are large, they are called combers or breaking seas. In deep water, these waves seriously affect the performance of small craft.



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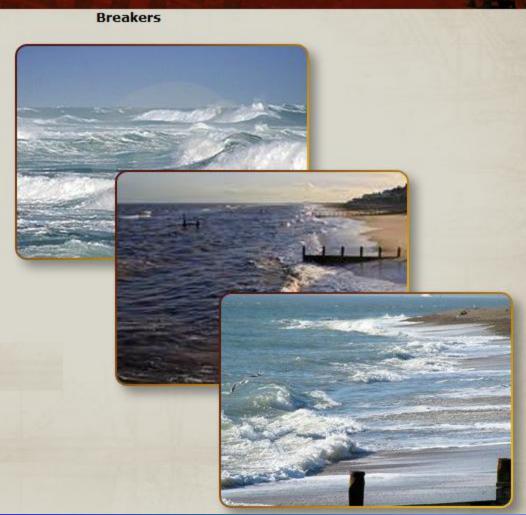
Breakers are waves breaking on the shore they are a series of moving ridges or waves that moves across the surface of a liquid (especially across a large body of water).

There are three types of breakers:

- Plunging
- Spilling
- · Intermediate surging

The most important difference between breakers of similar height is whether the breakers are the plunging, spilling, or intermediate surging type.

Because of the force of energy exerted in a plunging breaker, its impact on watercraft is greater than that of a spilling breaker.



Plunging

In a plunging breaker, the energy of the wave is released in a sudden downwardly directed mass of water. The wave peaks up until it is an advancing vertical wall of water.

The crest then curls over and drops violently into the preceding trough where the water surface is essentially horizontal.

During this process, much air is trapped in the waves. This air escapes explosively behind the waves throwing water high above the surface. The loud explosive sound of the plunging breaker easily identifies it during darkness or fog.

Plunging breakers usually occur on steep beaches rather than flat ones. However, when plunging breakers do occur on flat beaches, the beach is unusually regular, or has a temporarily steep section of beach in the breaker zone.

Beaches in protected bays and estuaries subject only to waves that have undergone considerable refraction or diffraction almost always produce plunging breakers.

Spilling

In a spilling breaker, energy is not released at once, and the breaking process occurs over a large distance as the breaker travels toward the beach.

The wave peaks up until it is very steep, but not vertical. Only the topmost portion of the crest curls over and descends on the forward slope of the advancing wave where it slides down into the trough.

This process starts at scattered points that converge until the wave becomes an advancing line of foam.

The disturbing conditions, irregular profile, and bottom irregularities of a flat beach make it more suitable to spilling breakers.

Surging

A surging breaker is seen less often than a plunging or spilling breaker. In a surging breaker, the wave crest advances faster than the base of the wave looking like a plunging breaker.

The base of the wave then advances faster than the crest. The plunging is arrested and the breaker surges up the beach face.



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Estimating Breaker Heights

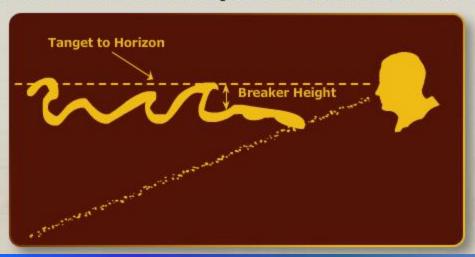
To successfully traverse the surf zone, landing craft must first estimate the direction and total distance of drift, then direct a course so that the craft meets the breaker's crest head on or directly astern.

The breaker or wave period affects the speed at which the craft encounters breaking waves.

Short period storm waves from local sources may occur every 6 to 12 seconds. At this frequency, a craft does not have the opportunity to pass the breaking waves.

The observer on the beach adjusts his position vertically so his line of sight corresponds with an imaginary line from the top of the breaker to the horizon.

The vertical distance from this line to the lower limit of the backwash is the approximate height of the breaker. The lower limit of the backwash is the lower limit of the trough between breakers close to the beach.





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Estimating breaker height along with the beach gradient can identify the type of breakers being viewed, but be aware that this system is less accurate as the distance between the observer and the wave increases.

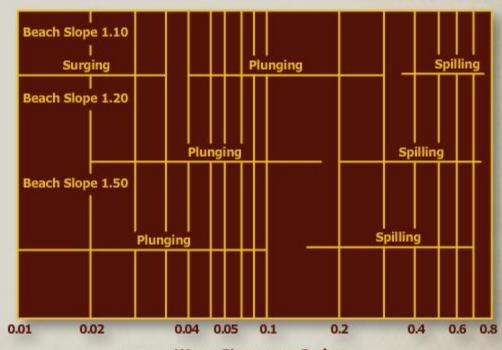
Many of the craft used in amphibious operations are small and, because they are designed to land upon the beach, are not sea-worthy.

Owing to the size of landing craft, breaker height, breaker type, the angle of breakers to the beach, and the longshore current speed can have a dramatic effect on amphibious operations and are of vital importance.

The wave steepness index is the ratio of the deep water wave height to deep water wave period squared.

In relative deep water, wave stability depends critically on the wave steepness; whereas in shallow water, wave stability becomes dependent upon the wave height to water depth ratio.

Estimating Breaker Heights (cont.)



Wave Steepness Index



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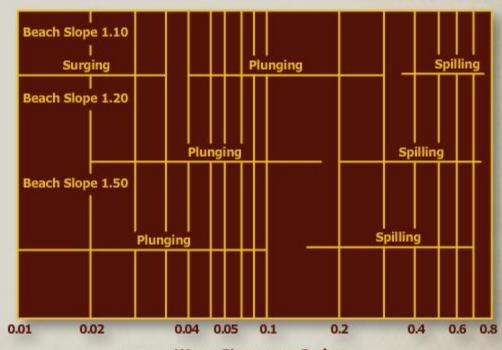
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Estimating Breaker Heights (cont.)



Wave Steepness Index



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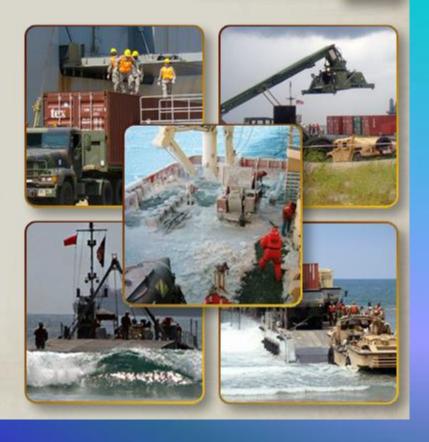
Key Points

The following key points were discussed:

- Organization and Command of JLOTS
- · Planning a JLOTS operation
- · Sequence of Work
- Specific JLOTS Planning Considerations
- · Throughput Planning
- Site Selection
- · Beach Characteristics and Beach gradient
- Anchorages and Swing Areas
- Sea State, Weather, Surf, and Breakers









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Quick Challenge



Which of the following are considered as advantages of a JLOTS operation?

Select all that apply and then select Submit.



Supports Beachhead Operations



Used in absence of fixed port



Replaces inadequate or destroyed fixed ports



Reduces land transportation distances



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Quick Challenge



When selecting a specific area for beach operations which of the following physical and environmental characteristics must be considered?

Select all that apply and then select Submit.

Safe Haven



Beach gradient at various tide stages



Length and width of beach



Depth of water close inshore

Security



Wind and weather conditions in the area



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Cargo Control and Documentation

The Department of Defense uses DOD 4500.32-R, "Military Standard Transportation and Movement Procedures (MILSTAMP)," to provide specific guidance for documenting cargo movements.

Automated data is captured in JLOTS by the logistics applications of automated marking and reading symbols technology and cargo documentation requirements.

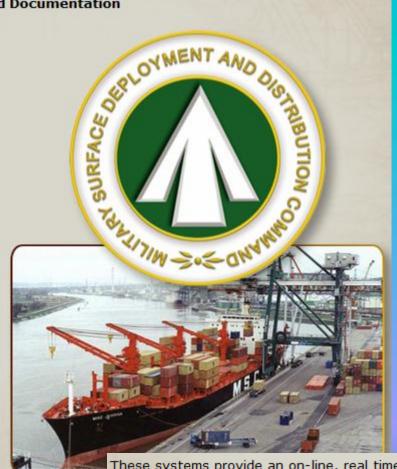
The cargo control and documentation systems used to receive and process military standard transportation and movement procedures data in a JLOTS operation are:

- The Global Air Transportation Execution System (GATES)
- The Worldwide Port System (WPS)

These systems provide an on-line, real time cargo monitoring and managing capability with which landing force logistics personnel may track or control cargo from the point of origin to distribution to consumers and users in the amphibious objective area.

Additionally, the Surface Deployment Distribution Command (SDDC) will provide expertise to the JLOTS commander on cargo control and documentation matters including manifest, cargo traffic messages, and stow plan information.

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Cargo Control and Documentation (cont.)

The four most important MILSTAMP documents used in JLOTS and other beach operations are the:

- Transportation control and movement document (TCMD)
- Ocean cargo manifest (a "ship's manifest," DD Form 1385)
- Stowage plan
- · Military shipping labels



Transport Control and Movement Document

A TCMD is prepared for each shipment unit, as defined in MILSTAMP. The shipment unit can be one or more pieces of cargo.

The TCMD provides information required to physically handle the cargo, its routing, priority, and destination.

In addition to providing this information, the TCMD serves as a receipt for the cargo and its condition as it is moved through the transportation system.

Ocean Cargo Manifest

Ocean cargo manifests are made for each port of call on a ship's voyage.

These manifests provide information on the vessel and all cargo destined for a given port of call including any hazardous cargo that is being shipped.

Information on the vessel includes its type, charter, estimated time of arrival, and self-sustaining characteristics.

The stowage location and reprint of all information on the TCMD is given for all cargo to be discharged at the port.

Stowage Plan

A stowage plan is a diagram of a ship on which is overlaid the location of all cargo stowed aboard the vessel.

The stowage plan is part of the Integrated Computerized Deployment System which supports administrative, tactical, and pre-position load planning for breakbulk, container, RO/RO, and fast sealift ships operations.

Military Shipping Labels

Each piece of cargo has the latter shipping label that indicates the lot of cargo, or shipment unit, of which it is a part of the TCMD. Other information about these documents follows.



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The Cargo Offload and Discharge Systems (COLDS) are used by both the Army and the Navy.

Individual system manuals should be consulted for detailed planning information.

Army JLOTS equipment includes lighterage, Roll-on/Roll-off Discharge Facility (RRDFs), causeway systems, terminal service unit materials handling equipment (MHE), shore-based water storage systems, and a tactical petroleum terminal (TPT).

The majority of construction equipment will be provided by supporting engineer units.

The basic building blocks of the COLDS are:

- · Side Loadable Warping Tug (SLWT)
- · Causeway Section, Powered (CSP)
- Causeway Section, Nonpowered
- · Army Modular Causeway System
- Navy RO/RO Discharge Facility (RRDF)
- Army Modular RO/RO Discharge Facility (RRDF)

Cargo Offload and Discharge System







Side Loadable Warping Tug

The SLWT, the workhorse of the COLDS system, is the craft used to install, tend, and maintain other causeway system components.

The SLWT currently exists in the Navy and in the Army. Both are of standard configuration.

The SLWT is 85 feet long (5 feet shorter than other Navy standard causeways) to keep it within the parameters for side loading on the Navy's landing ship, tank (LST) class ships when the A-frame is in the stowed position.

Causeway Section, Powered

The CSP (see Figure IV-2) is the normal power unit for causeway ferries; the SLWT can also perform the function. The CSP propulsion system is identical to that of the SLWT.

However, its hull is 5 feet longer, and it does not have a winch, A-frame, or stern anchor installed.

Army Modular Causeway System

The Army's modular causeway system is similar to the NL causeway system. The modular causeway section (MCS) is the basic unit that comprises the Army's floating causeway systems.

These MCSs are the building blocks that make up the MCS causeway ferry, RRDF, and the MCS floating causeway pier.

Army Modular RO/RO Discharge Facility

The Army's modular RRDF has no standard configuration. Design of the facility has been an evolutionary process facilitated by joint operational tests and evaluations.

It is constructed with eight sections forming a rectangle and two sections end-to-end inboard and aft.

Causeway Section, Nonpowered

Causeway Section, Nonpowered (CSNP). The CSNP is made up of three 7-foot wide and six 15-foot long configurations of the basic pontoon can to produce the 90-by 21-foot sections.

The different configurations of the CSNP are:

- Causeway Section, Nonpowered (Beach End)
 (CSNP[BE]). The CSNP(BE) is equipped with a
 folding beach ramp. It is used as the beach end
 of causeway ferries, permitting rolling stock to
 drive off the ferry. It also permits container
 handlers to drive onto the causeway and pick up
 containers.
- Causeway Section, Nonpowered (Sea End)
 (CSNP[SE]). The CSNP(SE) is equipped with a
 sloping notch and rhino horn. It is used as the
 seaward end of a causeway pier used by assault
 forces and the Army and as an administrative
 pier. The Army also includes one CSNP(SE) as a
 seventh section of the Army RRDF. The notch is
 designed to receive the bow of an LST. The rhino
 horn slips through a hole in the bow ramp of the
 landing craft, utility (LCU) or landing craft,
 mechanized (LCM) -8 to hold the LCU or LCM-8 in
 position while vehicles are embarked and
 debarked.

Navy RO/RO Discharge Facility

The RRDF provides a means of debarking vehicles from RO/RO ships in-stream to lighters.

It consists of six CSNP(I) joined together in a configuration of 2-long, 3-wide sections to form a 65-foot by 182-foot Navy standard RO/RO platform.

Vehicles can be driven from the ship onto the platform and then onto causeway ferries, LCUs, or logistics support vessels (LSVs) for delivery to the beach.

The RRDF requires the services of one SLWT and one CSP for assembly, operations, and maintenance and a 6,000-pound forklift is required during assembly. Assembly time is approximately 6 to 8 hours.



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Elevated Causeway Operations

Elevated Causeway Systems (ELCAS) are a key element in the movement of containerized cargo ashore in an unimproved beach area.

It provides the capability to unload lighterage from beyond the surf zone and where difficult beach gradients exist, such as sand-bars, which may cause conventional lighters to ground far from a dry beach.

The ELCAS is also capable of removing rolling stock (within the capacity of the container crane) and breakbulk cargo from lighters and is required to extend up to 3,000 feet seaward beyond the surf zone until a mean high water (MHW) depth of 20 feet or a mean low water (MLW) depth of 12 feet at the end of pierhead is reached.

The ELCAS deck should be 20 feet above MLW to survive high storm tides. The 240-foot by 48-foot pierhead must be capable of round-the-clock simultaneous lighterage off-loading operations on both sides.

Installation of a 3,000-foot system is required within 10 days (24-hour operations) in environmental conditions through sea state 3 and 16-knot winds.

The system is also required to withstand severe storm conditions, including 75-knot winds, 9-foot surf, and 2-foot storm surge with a maximum of 24 hours warning for preparation.







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Floating Causeway Pier Operation

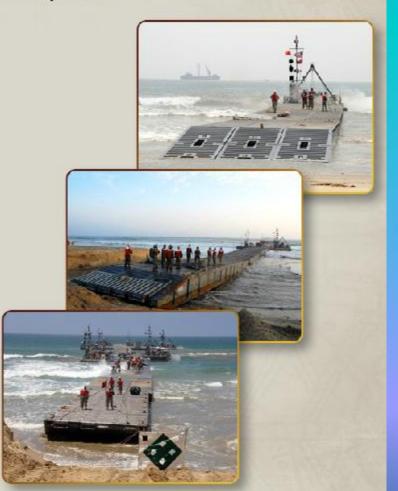
The Army's modular causeway system is similar to the Navy lighterage (NL) causeway system.

The modular causeway section (MCS) is the basic unit that comprises the Army's floating causeway systems.

These MCSs are the building blocks that make up the MCS causeway ferry, Roll-on/Roll-off Discharge Facility (RRDF), and the MCS floating causeway pier.

The MCS is comprised of:

- Nine separate modules; six 20-foot end rake modules and three 40-foot quadrafloat modules.
- The end rakes are fully compatible with the Navy lighterage (NL) end rakes (P8M, P8F, P8C) in that the modular end rakes are right hand (402-MR), left hand (402-ML), and center (402-MC).
- Two end rakes are attached to a quadrafloat module (400) and these three modules are now called a "string." Three strings make up a MCS which is 80 feet long by 24 feet wide and 4.5 feet in depth (six inches less than an NL section).





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Special Equipment and Material

Although terminal service units are responsible for beach preparation, engineer combat-heavy and port construction engineer units will provide supervisory personnel and perform most engineering construction tasks in the operational area.

Terminal Service Unit Material Handling Equipment (MHE) consists of the following:

- Rough Terrain Container Handler (Caterpillar)
- Rough Terrain Container Handler (Kalmar)
- Yard Tractors
- 4,000 lb Commercial Forklift









Rough Terrain Container Handler

The Truck, Container Handler, Rough Terrain (RTCH), 50,000 LBS Capacity, Diesel Engine Driven (DED), with Tophandlers was produced by Caterpillar Tractor Company, Peoria, IL, as a military unique integration of commercial components.

The RTCH provides the capability of handling the 8-foot wide 20- and 40-foot long ANSI/ISO containers with gross weights of up to 50,000 pounds. It is a rough terrain vehicle designed for operating on soft soil conditions such as unprepared beaches.

The RTCH has four-wheel drive and is capable of operating in up to 5 feet of sea water. The RTCH also comes with forks, used to load and unload flatbed trailers and rail cars, or move and stack materials.

Rough Terrain Container Handler

The Kalmar RT-240 Rough Terrain Container Handler (RTCH) is used to take advantage of worldwide standardization of shipping containers.

This RTCH is powered by a six-cylinder turbocharged diesel Cummins QSM 11 engine, 400 hp using JP-8 fuel. The Kalmar RTCH weighs 118,000 lbs and can move containers up to 53,000 lbs (24,040 kg).

The Kalmar RTCH has a movable operators cab and folding boom assembly to reduce transport height so it can be transported by air (C-5 or C-17 drive-on), sea, rail or road without any disassembly.

It operates on beaches, rough terrain and unimproved surfaces where it can stack containers three high and has the reach capability to pick up a container in the second row.

Like the Caterpillar RTCH, the Kalmar RTCH weighs 118,000 lbs, has four-wheel drive and is capable of operating in up to five feet of sea water.

Yard Tractors

Yard tractors are designed to shuttle trailers within terminals rather than along highways.

These vehicles are highly maneuverable but cannot operate on loose sand and they have difficulty on sloped surfaces such as causeway ferry beach ramps and the Elevated Causeway Systems (ELCAS) turntable ramp.

These tractors have an automatic, hydraulic lift fifth wheel that allows coupling and movement of semitrailers without retraction of land legs.

Terminal units are also equipped with M871 or M872 semitrailers. These trailers can transport either breakbulk cargo or containers.

The M871 can transport one 20-foot container. The M872 can transport two 20-foot containers or one 35-to 40-foot container.

4,000 LB Commercial Forklift

Truck Forklift, clean burn diesel engine, 4,000 lb capacity with a 144 inch lift, and pneumatic tires.



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Special Equipment and Material (cont.)

Additional Terminal Service Unit MHEs consists of the following:

- 4,000 lb Rough Terrain Forklift
- 4,000 lb Rough Terrain Extend **Boom Forklift**
- 6,000 lb Rough Terrain Forklift



4,000 lb Rough Terrain Forklift

The 4,000-pound rough terrain forklift (RTFL) is designed to stuff and unstuff the ISO containers. This RTFL is a diesel-powered, four-wheel-drive, hydraulically-operated forklift with a 4,000-pound lift capacity.

Its size enables it to go into a ISO/MILVAN container. The fork assembly is equipped to raise or lower, tilt forward or backward, shift right or left, and tilt right or left.

Steering is accomplished with the entire front axle pivoting under hydraulic power on a swivel immediately behind the driver's seat. In effect, it steers by a hinge in the chassis that "bends" the forklift in the middle.

This system causes it to require a larger turning radius but reduces the number of moving parts. In addition, the system makes it simpler to maneuver the RTFL on a ramp or inside a MILVAN container.

6,000 lb Rough Terrain Forklift

The Forklift, 6,000-lb, Variable Reach, Rough is designed for use as a forklift truck for loading and unloading boxes and palletized ammunition loads from transport vehicles and containers.

The forks tilt, level, and side shift to maneuver loads. The 6000M lifts loads of 6,000 lbs. to a height of 23 ft. and 4,000 lbs. to a height of 26 ft.

The 6000M can tow other vehicles weighing up to 27,100 pounds. The operator can select one of three steering modes: two wheel, four wheel, and crab wheel.

The vehicle frame can be tilted 9 degrees to left or right which allows vehicle to be level when traversing a side slope. The forklift is all-weather operational and can ford up to 30 inches of water.

4,000 lb Rough Terrain Ext. Boom Forklift

The Extended Boom Forklift (EBFL) is a four-wheel drive, rubber-tired forklift with two-wheel, four-wheel and crab steering. EBFL is capable of moving all palletized classes of material, up to its rated capacity.

It is medium-lift capable, with an optimum lifting range of 4,000 to 11,000 pounds. The EBFL uses extendable boom technology to lift loads of 4,000 pounds out to twenty-seven feet and can stack and retrieve loads up to twenty-five feet high.

It is air-transportable in CH-53 and KC/C-130 aircraft. EBFL can operate in rough terrain and is self-deployable with a maximum off-road speed of 35 miles per hour and a cruising range of 425 miles.

A frame-leveling capability allows it to handle sensitive or potentially dangerous loads while traveling over rough terrain. Diesel power provides drive power to a hydrostatic transmission with four forward and four reverse speed selections.

It can ford up to 60 inches of water with no equipment preparation required, and has an enclosed cab that allows for extended operations in all weather conditions.



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Special Equipment and Material (cont.)

Additional Terminal Service Unit MHEs consists of the following:

- . 10,000 lb Rough Terrain Forklift
- 20 Ton Rough Terrain Crane
- . 130 Ton Crane
- 140 Ton Crane
- Bulldozer
- · Beach Mats/Sand Grids





10,000 lb Rough Terrain Forklift

The 10,000 lb Rough Terrain Forklift can reach into trucks or shipping containers lift loads over obstacles and pick up loads from both above and below grade. It has a maximum reach of 28 ft (8.5 m) and lift loads of up to 10,000 lbs, (4,536 kg). It is equipped with fourwheel drive, four-wheel steer and exceptional ground clearance.

20 Ton Rough Terrain Crane

The 20 Ton Rough Terrain Crane is a 40,000 pound capacity cable crane mounted on a 4x4 carrier. The carrier is powered by a Cummins 265 V8 diesel engine mated to a Powershift transmission.

The crane is separately powered by a Cummins JN 6I turbocharged 6 cylinder diesel engine. The all wheel drive carrier is equipped with air brakes, a hydraulic front plow blade, and four hydraulic outriggers that are operated from the cab.

The highly maneuverable unit has a max highway speed of 30 mph and a wide range with its 110-gallon fuel tank.

130 Ton Crane

This crane has similar capabilities as the 140 Ton Crane but its load lifting capabilities is limited to 130 Tons. This crane is used to construct Elevated Causeways and to discharge cargo from lighterage.

140 Ton Crane

The 140-ton lattice boom crane is truck mounted for easy transportation and setup. Its has a boom reach of 230' with the main boom and is extendable to 260' with jib combinations. This crane is used to construct Elevated Causeways and to discharge cargo from lighterage.

Bulldozer

Bulldozers are used for several purposes, including surface preparation, berm construction, and vehicle MHE recovery. Tires can be placed on the bulldozer's blade to push landing craft back in the water.

Beach Mats/Sand Grids

Beach roadways will be constructed where the bearing capacity of the beach surface is less than the ground pressure of the MHE or RO/RO cargo.

Roadways may be constructed by using beach reinforcement expedients, including mobility matting, sand grid (a plastic material designed to confine sand or other cohesion less materials to produce a load-distributing base layer), or local materials such as gravel or crushed rock.

Airfield steel planking and UNI-MAT (a commercial wooden interlocking mat system) are also excellent beach surfacing materials. Beach roadways must be wide enough for the largest vehicle and must be constructed with areas for passing and turning.



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Security of Off-load Anchorage or Beach Areas

JLOTS operations are a critical link in the resupply system; therefore, an attack in one form or another can disrupt the supply lines.

JLOTS operations are normally conducted in a low threat environment; i.e., the operation is out of range of enemy artillery fire.

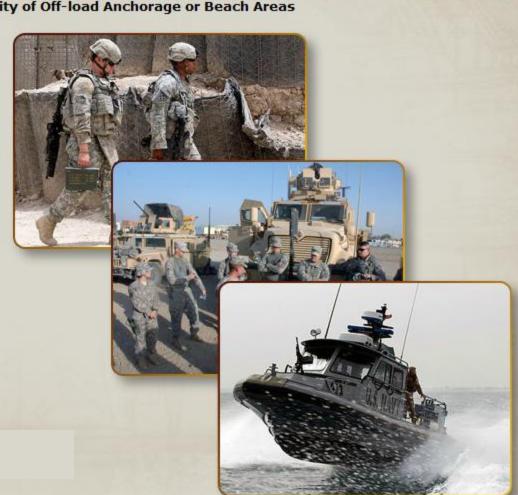
The primary threats to consider are:

- Air and rocket attack
- · Attack by enemy forces or querrillas operating behind the lines
- Sabotage
- · Nuclear, biological, and chemical (NBC) warfare

The defensive posture of the terminal battalion varies depending on the type of threats considered likely.

The two areas of security that must be considered are:

- Offshore Security
- Beach Security



Offshore Security

Offshore security in the anchorage area is particularly important because of the vulnerability of strategic sealift ships.

Unlike naval ships, merchant type ships are relatively thin-skinned and sparsely compartmented, rendering them vulnerable to catastrophic loss.

Generally speaking, these ships are unarmed, with the exception of small arms capable of providing basic self-defense against unauthorized intrusion.

Security measures may be both active and passive. Active security involves seeking out and neutralizing any enemy threat.

Passive security focuses on timely detection of threats.

Local security in the anchorage area may include the following efforts: active and passive surface patrol and interdiction operations, active and passive antiswimmer operations that could include the use of combat swimmers, concussion grenades, charged firehoses, various detection systems or sensors, and roving patrols.

Beach Security

The provision and execution of beach area security is completely scenario-dependent. In the early post-assault phase of an amphibious operation, security of the beach reception area may be carried out by air, ground, and naval combat forces.

At the other end of the spectrum, as would normally be expected in a JLOTS operation, security in a nonhostile overseas environment may be provided largely by the host nation.



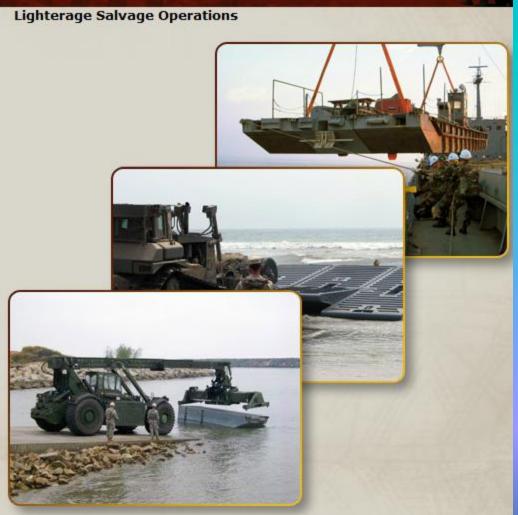
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A certain amount of casualties among supporting lighterage and other discharge support assets is inevitable while conducting JLOTS operations.

Lighterage salvage is the salvage, emergency repair, and clearing of damaged, inoperative, broached, or stranded lighterage, including discharge facilities and other off-load support craft and equipment.

The primary objective of salvage operations is to assist, as appropriate, in maintaining the continuous flow of cargo ashore.

In accomplishing this objective, salvage includes keeping the beach and sea approaches clear, assisting discharge facilities and supplementary equipment when required, and moving or assisting incapacitated lighterage to designated repair sites.





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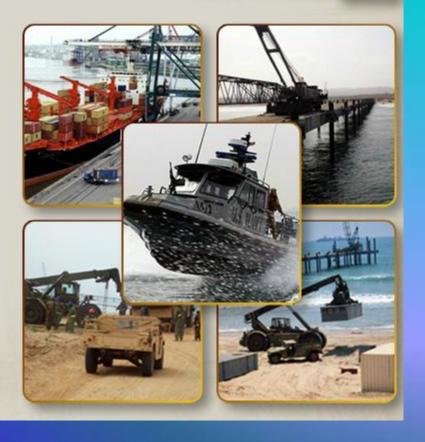
Key Points

The following key points were discussed:

- Cargo Control and Documentation
- Cargo Offload and Discharge System
- Elevated Causeway Operations
- · Floating Causeway Pier Operation
- · Special Equipment and Material
- · Security of Off-load Anchorage or Beach Areas
- Lighterage Salvage Operations









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Quick Challenge



Which of the following systems are used for cargo control and documentation to receive and process military standard transportation and movement procedures data in a JLOTS operation?

Select all that apply and then select Submit.

- A. The Global Air Transportation Execution System (GATES)
- B. The Worldwide Port System (WPS)
- C. Standard Army Management Information Systems (STAMIS)
- D. Global Transportation Network (GTN)

Feedback

Review Close

Correct. The Global Air Transportation Execution System (GATES) and the Worldwide Port System (WPS) are cargo control and documentation systems used to receive and process military standard transportation and movement procedures data in a JLOTS operation. Select the Next arrow to continue.



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Quick Challenge



Which Material Handling Equipment (MHE) is used to move ISO containers from lighterage to the marshalling area?

Select the best answer and then select Submit.



- A. Rough Terrain Container Handler
- **B. Yard Tractors**
- C. 4,000 lb Rough Terrain Forklift
- D. 6,000 lb Rough Terrain Forklift





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Cargo off-loading of strategic sealift ships is essential to the strategic sealift mission and may be conducted by Navy and/or Army forces augmented by civilian ship crews and USMC support unit force personnel as necessary, depending on the mission.

The Army has primary responsibility for providing forces and equipment and conducting strategic vessel discharge operations incident to base, garrison, or theater development operations.

The JLOTS commander must ensure that the unloading systems (lighterage, cranes, hatch kits, winches, auxiliary crane ships, and other requirements) and embarked vehicles for discharge are prepared for discharge operations.

Ship and cargo configuration and ship stow plans must be considered when developing unloading equipment and personnel requirements.

Ship Discharge Operations









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Ship Discharge Plan

To effectively execute the discharge of ships delivering cargo to the operational area, the JLOTS commander must ensure that discharge plans are developed, coordinated, and followed.

The elements of a discharge plan will vary with different types of vessels that are to be unloaded.

Essential elements of any discharge plan will include the items shown.

Lighterage Utility for Different Types of Ships				
Skip Type	Lighterage			
Breakbulk	LCU, LCM-8, LARCX-LX			
Containership	Causeway Ferry, LCU 1/,LARC-LX, LSV			
RO/RO	Causeway Ferry, LCU, LCM-8 ^{2/} , Army LSV			
LASH	Craft for Barge Towing 3/			
SEABEE	Craft for Barge Towing 3/			

^{1/} for containers, LCUs 1600 and 2000s can be off-loaded at the ELCAS;

the LSV can only be off- loaded at a causeway pier 2/ Army rhino horn-equipped LCM-8s only

^{3/} LASH and SEABEE barges can only be off-loaded by ELCAS or shoreside cranes



Senior Transportation Officer Qualification Course Lighterage - JLOTS

Discharge of containerships, both selfsustaining and non-self-sustaining ships, will be conducted as an integral part of JLOTS.

Container unloading order is provided by the ship unless specific cargo is needed ashore.

During ship discharge planning, the debarkation officer should calculate the "long hold" to get an estimate of the length of time that will be required to unload the containership.

The "long hold" of a ship is that hold that will require the most time to unload.

Characteristics of various ship classes are in Appendix C, "Ship Characteristics." of Joint Pub 4-01.6.

Containership Discharge





Senior Transportation Officer Qualification Course Lighterage - JLOTS

Lighterage - Container Operations

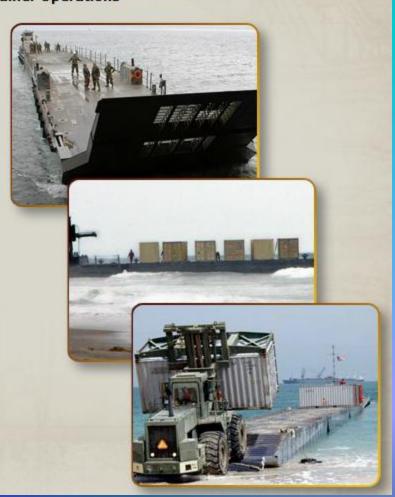
The causeway ferry is an excellent platform for container transport and is the most efficient lighter for container operations.

Due to its ability to change configurations, it is flexible and adaptable to operational requirements, weather conditions, beach conditions, and theater off-loading capability.

It is more capable of operating in shallower beach gradients than other lighters. Twenty and forty-foot containers are mostly efficiently transported to the beach by double-wide and regular causeway ferries.

The method of stowing containers aboard lighters is determined by the weather and swell conditions and by the method of discharge used on the beach. Lighter loading varies according to beach gradient, lighters weight limitations, and transfer facilities.

Containers on landing craft are normally transferred at the water's edge by RTCHs, rough terrain container cranes (RTCCs), and 140-ton cranes or, beyond the surf zone, by a 140-ton crane at the ELCAS.





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RO/RO ships are the preferred mode of transporting tracked or wheeled combat equipment to an operational area. They have the distinct advantage of a fast turnaround (load

and offload) when equipment can be

driven on and off the ships.

To take advantage of their inherent ramp discharge capability, the Army and the Navy have developed an RRDF to provide a means of placing vehicles aboard lighters. The facility can be arranged without a ramp for self-sustaining RO/ROs or with a ramp for non-self-sustaining RO/ROs.

Army Modular RO/RO Discharge Facility (RRDF) has no standard configuration.

It is constructed with eight sections forming a rectangle and two sections end-to-end inboard and aft. A sea end section is placed one string outboard of the end-to end sections.

RO/RO Discharge Facility









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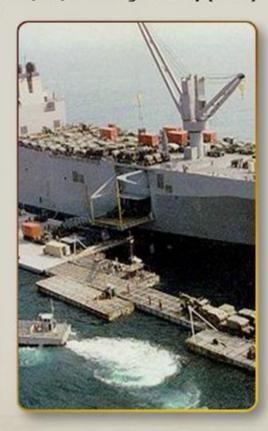
RO/RO/ Discharge Facility (cont.)

Fenders are placed along the outboard sides of the two end-to-end sections. The "finger pier" configuration just described provides stable side mooring, keeps the lighter from getting under the ship's counter, and provides lighter masters more confidence when approaching and mooring.

The principal elements of the RRDF are RO/RO platform, ship fendering system, and calm water ramp (CWR).

The CWR is 120 feet long and is composed of three 40-foot welded sections that are fastened together on the platform using pins at the bottom and bolts at the top. The CWR is used for loading and unloading non-self-sustaining RO/RO ships.

The maximum ramp operating angle is 15 degrees. The ramp surface has a stud pattern and is painted with a textured coating to provide a high traction surface. The maximum sea state for a tank on the ramp is sea state 1.







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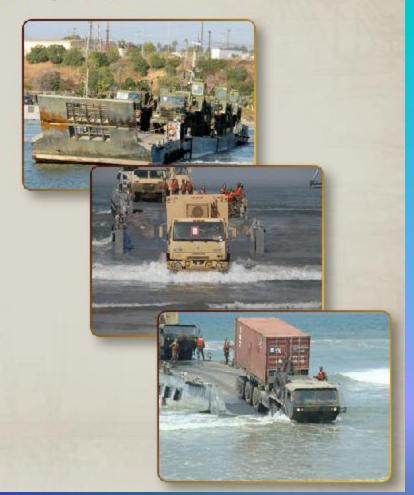
Lighterage - RO/RO Operations

Where possible, RO/RO operations will be conducted. Landing craft and causeway ferries are used to transport vehicles ashore from offshore discharge positions.

Vehicles are driven aboard in a manner to facilitate discharge by driving the vehicle forward. Normally, vehicles are backed aboard landing craft. Vehicles should be appropriately secured while in transit, including having brakes set.

When vehicles are loaded onto lighterage follow these procedures:

- Vehicles will be loaded with the front of the vehicle facing the bow for ease of drive off at the beach.
- When cargo on chassis is loaded onto lighterage, the tractor coupling will be kept toward the bow.
- When tracked vehicles are driven on or off lighterage, dunnage must be laid on the lighter's cargo deck, unless the vehicle has adequate rubber track pads.
- When driving vehicles off lighterage, ramp angle must be considered to determine if vehicles and/or trailers might be damaged.





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Breakbulk discharge operations involve the off-loading of a multitude of nonhomogeneous cargoes such as pallets, bags, bales, cartons, crates, cases, barrels, or drums.

General cargo or breakbulk ships, with multiple hatches and holds fitted with booms or cranes for their own self-support of over-the-side cargo loading and discharging, are normally associated with these discharge operations.

The ships are also able to accommodate limited heavy lifts, vehicles, bulk cargoes, refrigerated commodities, and containers.

One of the commodities most frequently shipped breakbulk is ammunition.

Breakbulk Discharge



KICHTRRACK - JILOTS



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All lighterage is capable of transporting most breakbulk cargoes to beach discharge sites.

Although some outsized cargoes may not be compatible with smaller landing craft or amphibians.

Landing craft utility (LCUs), air cushion watercraft, or causeway lighterage would be able to accommodate such cargo.

Breakbulk cargo is loaded aboard lighterage by ship's cranes or transport auxiliary crane ship (T-ACS).

The lighterage is prepared by providing dunnage, where appropriate, and cargo-securing equipment.

Depending upon the sea state, cargo type, distance to the lighterage offload site, and the surf conditions, breakbulk cargo should be secured to some degree.

All lighterage is capable of transporting most breakbulk cargoes to beach discharge sites.

Although some outsized cargoes may not be compatible with smaller landing craft or amphibians.

Landing craft utility (LCUs), air cushion watercraft, or causeway lighterage would be able to accommodate such cargo.

Lighterage - Breakbulk Operations









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The two types of barge carrying systems are the:

- · Lighter Aboard Ship (LASH)
- Sea Barge (SEABEE)

Barge carriers are designed to carry specially designed barges or a combination of such barges and containers.

These barges are loaded or discharged at berths by shore-based cranes.

Barge Ships





Lighter Aboard Ship

The LASH is a single-decked vessel with large hatches, wing-tank arrangements, and a clear access to the stern. The LASH has a gantry crane with a cargo handling capability of up to 450 LTON.

The function of this crane is to convey barges or lighterage from the stowed location aboard the ship to the stern region and to lower the barges or lighterage into the water.

Some LASH ships are equipped with container gantry cranes for handling the onboard complement of containers. Different classes of LASH ships have capacities ranging from 49 to 89 barges or a mixture of LASH barges and military lighterage.

The external dimensions of the LASH barge are 61 feet 6 inches long by 31 feet 2 inches wide. The LASH barge has a clear hatch opening of 26 feet by 44 feet.

The internal dimensions are 59 feet 11 inches long by 30 feet, 1 inch wide. The minimum overhead clearance within the barge is 9 feet 11 inches.

The LASH barge has stacking spacers that provide about 1-foot of additional overhead clearance when the hatch covers of the individual barges are not used. The use of spacers provides an approximate class height of 13 feet 6 inches on the barge square of the hatch.

The typical empty LASH barge weighs 80 LTON and has an average cargo capacity of 370 LTON. The draft ranges from 2'9" to 8' from light to loaded draft, respectively.

Sea Barge

The SEABEE is arranged much differently from the LASH in that it has three decks on which the cargo barges or container flats are stowed. Barges are brought to each deck level by a stern elevator and are moved internally within the ship by the Transporter (conveyor) System.

Two barges can be loaded or discharged in a cycle of about 40 minutes. The SEABEE ship is the preferred ship to transport Army watercraft such as the landing craft utility (LCU) and lighter amphibious resupply cargo (LARC).

The SEABEE barges are an overall length of 97 feet 6 inches, a width of 35 feet, and a height of 14 feet 7 inches with covers.

The internal dimensions are 90 feet long by 30 feet 3 inches wide. The overhead clearance directly below the hatch opening is 14 feet 7 inches, and under the forward and aft 3 feet, it is 11 feet 3 inches.

The clear opening, with all hatch covers removed, is 84 feet by 30 feet 3 inches. The overhead clearance below the hatch opening of the barges loaded on the weather deck can be increased to 16 feet 11 inches by leaving off the hatch covers.

The typical empty SEABEE barge weighs 166 LTON and has a cargo capacity of 834 LTON. The draft ranges from 1'9" to 10'7" from light to loaded draft, respectively.



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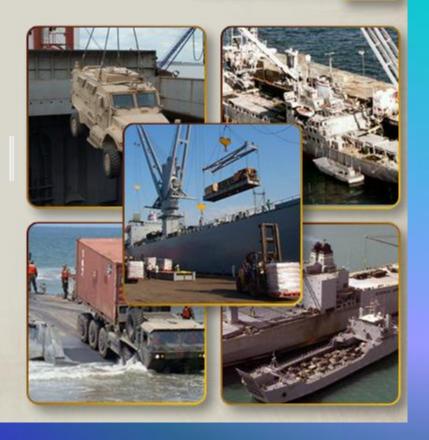
Key Points

The following key points were discussed:

- · Ship Discharge Operations
- · Ship Discharge Plan
- · Containership discharge
- · Lighterage Container Operations
- RO/RO Discharge Facility
- · Lighterage RO/RO Operations
- · Breakbulk Discharge
- · Lighterage Breakbulk Operations
- Barge Ships









Senior Transportation Officer Qualification Course Lighterage - JLOTS

Quick Challenge



If you are discharging cargo from a "long hold" what type of ship are you unloading?

Select the best answer then select Submit.

- A. Roll-on/Roll-off RO/RO ship
- B. Breakbulk ship
- C. Barge ship



D. Containership



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Quick Challenge



When loading vehicles wheeled or tracked on to lighterage from a RO/RO ship which direction on the lighterage should the front of the vehicle be pointing?

Select the best answer and then select Submit.

- A. Port
- B. Stern



- C. Bow
- D. Starboard





Senior Transportation Officer Qualification Course Lighterage - JLOTS

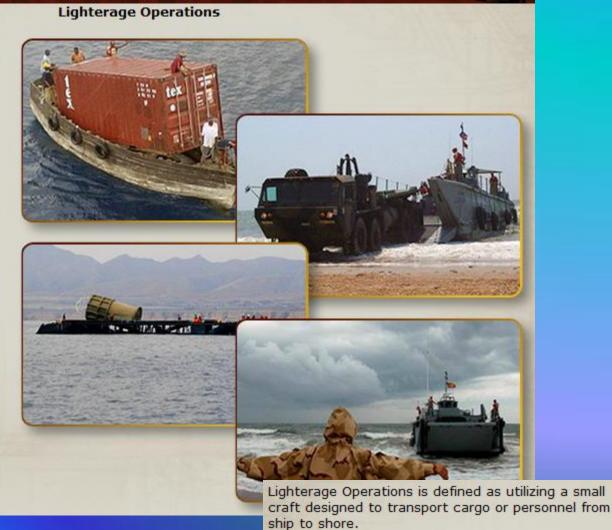
Lighterage Operations is defined as utilizing a small craft designed to transport cargo or personnel from ship to shore. Lighterage includes amphibians, landing craft, discharge lighters, causeways, and barges.

Lighter is the general name for a broad, flat-bottomed boat used in transporting cargo between a vessel and the shore. The distinction between a lighter and a barge is more in the manner of use than in equipment.

The term "lighter" refers to a short haul, generally in connection with loading and unloading operations of vessels in harbor while the term "barge" is more often used when the cargo is being carried to its destination over a long distance (Joint Publication 1-02).

NOTE:

The only vessel/vehicle referred to as amphibious is the LARC, currently not employed in Army Lighterage operations, but may be utilized under a joint operations scenario.



Lighterage includes amphibians, landing craft, discharge lighters, causeways, and barges.



Senior Transportation Officer Qualification Course Lighterage - JLOTS

The JLOTS commander will designate responsibilities for control of lighterage in the JLOTS OPORD.

Assignment of responsibilities will be heavily dependent on the type of units available (Army or Navy) to conduct discharge operations.

The procedures for control of lighterage in JLOTS have been standardized through incorporation of both Army and Navy methods.

See the Transition Functions and Control for LOTS and JLOTS Operations chart for additional information.

Responsibilities

Transition Function and Control for LOTS and JLOTS Operations

Functions	Responsible Person / Activity by Operation Type					
	PHIBOP	MPF OPS	NAVY LOTS	JLOTS	ARMY LOTS	
Commanding	CATF	MPF Commander	отс	JLOTS Cmdr	Terminal Gp Cdr	
In Charge of Off-loading	Assit Group Cmdr	PCO	осо	осо	Terminal Bn Cdr	
Ship Discharge	Cmdg Officer	Debarkation Officer	Debarkation Officer	Debarkation Officer	Ship Plat Ldr	
Lighterage Cntl (overall)	PCO	PCO	осо	JLCC	LCC	
Lighterage Cntl (at ship)	Combat info. Center	LCT	rco	SLCP	SLCP	
Lighterage Cntl (At Beach)	ВРТ	ВРТ	ВРТ	BLCP	BLCP	
Beach Clnc & Marshalling Yd	Shore Party	Shore Party	Shore Party	BCU	BOG	

CATF = Commander, Amphibious Task Force LCO = Lighterage Control Officer OTC = Officer in Tactical Command LCT = Lighterage Control Team CMPF = Commander Maritime Pre-positioning Force BLCP = Beach Lighterage Control Point

CMPF = Commander Mandme Pre-positioning For Assit Gru = Assault Group JLCC = Joint Lighterage Control Center, LCC = Lighterage Control Center SLCP = Ship Lighterage Control Point CIC = Combat Information Center

BPT = Beach Party Team

BCU = Beach Clearance Unit

BOG = Beach Operations Group

PCO = Primary Control Officer OCO = Off-loading Control Officer



Senior Transportation Officer Qualification Course Lighterage - JLOTS

The use of lighterage in support of the ship-to-shore movement of cargo is weather-dependent. As sea state increases or temperature decreases dramatically, lighterage productivity decreases.

The ship-to-shore movement of cargo is currently limited by the capabilities of the discharge facilities to handle the cargo.

Lighter and ship discharge operations begin to degrade as conditions enter the upper half of sea state 2 and significant wave heights reach 2.5 to 3.5 feet.

The inherent risks of operating in sea state 3 are not worth the minimal productivity and possible equipment damage which could occur.

Such damage could prevent timely resumption of operations as weather clears.

Operational Limitations



The use of lighterage in support of the ship-to-shore movement of cargo is weather-dependent.

As sea state increases or temperature decreases dramatically, lighterage productivity decreases.

The ship-to-shore movement of cargo is currently limited by the capabilities of the discharge facilities to handle the cargo.



Senior Transportation Officer Qualification Course Lighterage - JLOTS

Computing Lighterage Turnaround Time

Turnaround time is the basic factor to determine lighterage capabilities and requirements.

It is used to compute the number of craft for a specific operation or the amount of tonnage that a given number of craft can deliver.

Turnaround time is the total elapsed time that a single lighter takes to load, travel to the discharge point, unload, and return to shipside ready to be loaded again.

The elements involved are:

- Average speed in the water and on land (for amphibians)
- Distance to be traveled
- Loading time
- · Unloading time
- Predictable delays

An estimated turnaround time must be worked out for each new operational site and mission and for each change in any of the elements given above.

Sea and terrain conditions affect speed, and variations in loads alter loading and unloading times. Average turnaround time is computed by using the following formula:





Turnaround time in hours =

water distance (round-trip) + land distance (round-trip) + Loading Time in hrs + unloading time in hrs + delays in hrs water speed (knots) land speed (mph)

Note:

Land distance only applies when computing turnaround time for amphibians or air-cushion vehicles.



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Lighter Requirements and Daily Tonnage Capabilities

Lighter Requirements

Once an average turnaround time is established the number of lighters required to deliver an assigned daily tonnage can be computed by using the following formula:

number of lighters required = daily tonnage × turnaround time in hrs average tons per lighter hrs of operation daily

Daily Tonnage Capabilities

Sometimes it is necessary to forecast the amount of tonnage that the available craft can transport over a specified period of time under existing conditions. Daily tonnage capabilities are computed by using the following formula:

daily tonnage capability = hours per operational day × average tonnage per lighter × number of lighters available turnaround time per lighter in hrs







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Maintenance management requires the combined efforts of all operating and maintenance personnel to ensure an effective and efficient program.

Commanders to which the unit's operating craft are attached are responsible for watercraft maintenance management.

Maintenance and repair of lighterage will be conducted by either **Navy** or **Army** units

Navy Maintenance Support

The Navy has the capability to establish two repair teams as the lighterage repair element - one afloat on the boat haven ship and one ashore as the lighterage repair element.

This is true as long as a boat haven ship remains in the area. On departure of the boat haven ships, the lighterage repair element ashore will make all repairs.

A lighterage repair plan is promulgated by preventive maintenance of lighterage equipment.

Maintenance





Army Lighterage Maintenance

The maintenance concept for watercraft provides maximum self-sufficiency, supportability, and maintainability with a minimum use of personnel, parts, material, and equipment.

Organizational and direct support maintenance for Army watercraft and amphibians are normally performed by the crew and unit maintenance personnel.

Backup direct support and general support maintenance are performed by a floating craft maintenance company for both types of craft or by a separate lighter maintenance company for older amphibians.

Depot-level maintenance that exceeds the capability of Army maintenance units is principally performed under contract by civilian shipyards. Army maintenance units are deployable to support contingencies.



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To maintain a smooth and continual flow of cargo over the beach, the lighterage unit commander must be aware of the status and location of his craft.

Having this knowledge allows him to relocate platoons, sections, and individual lighters or to assign new or additional missions as rapidly as possible.

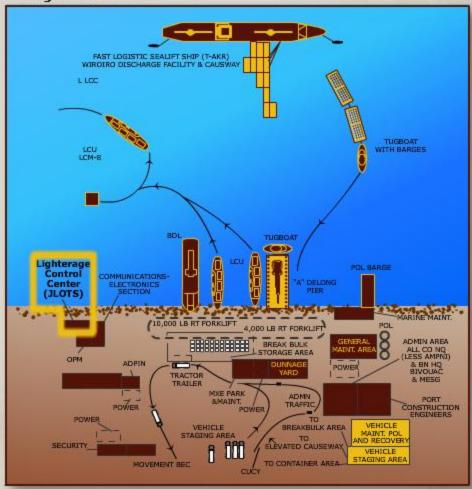
Flexibility of operations requires a responsive, closely monitored control system.

Control, maintained mainly by radio communication, is exercised through a lighter control center and various control points on the beach, at shipside, and in the discharge areas (for amphibians).

The following control points have been established:

- Joint Lighterage Control Center (JLCC)
- Ship lighterage Control Point (SLCP)
- Beach Lighterage Control Point (BLCP)

Lighter Control



Joint Lighterage Control Center

The JLCC is established to provide overall management and guidance throughout the JLOTS operation.

This includes assignment of lighters to SLCPs, monitoring ship-to-shore movement of lighters, ensuring safe lighterage operations, resolving disputes, managing available craft, establishing lighter anchorage sites outside of the active operations area, coordinating lighterage waterborne medical evacuations, and controlling lighterage entry and exit from the operational area.

When the operation commences, the JLCC will be the key coordinating body for lighter usage plans.

Ship lighterage Control Point

Personnel manning the SLCP should have an excellent working knowledge of lighter cargo capacities, deck loading configurations, lighter communications capabilities, and operating speeds.

Additionally, they should be knowledgeable of the cargo ships that will be used during operations and they should know how to optimally use assigned lighters at the ships discharge points.

The SLCP keeps track and controls the movement of lighters assigned to it by the JLCC and/or lighter usage plan. At the direction of the debarkation officer, it calls lighters from the queuing area to the correct cargo transfer station alongside the discharging vessel.

Once the lighter is loaded and at the direction of the debarkation officer, the SLCP issues instructions for the loaded lighter to cast off and contact the appropriate BLCP.

Additionally, the SLCP should monitor ship and lighter usage plans, maintains radio contact, and coordinates with the BLCPs and JLCC as required.

Beach Lighterage Control Point

Personnel manning the BLCP should be very familiar with lighter discharge operations involving the use of floating causeway piers, elevated causeway piers, amphibian discharge sites, and bare beach sites.

Additionally, a working knowledge of beach clearance systems is beneficial. Collocation of the beach clearance unit (BCU) commander with the BLCP is recommended.

As control of a lighter is passed from the SLCP to the BLCP, the BLCP, in coordination with the BCU commander, is then responsible for directing lighters to correct beach transfer sites at the beach or to a queuing area to await for a correct beach transfer facility or bare beach site.

The BLCP should obtain information from the lighter as to the quantity, type, and status of its cargo. This information is passed to the BCU so that adequate provisions can be made to receive and transfer any special or nonoperative cargo.

Once the lighter has been called forward and unloaded, the BLCP issues instructions to cast off and report to the SLCP. The BLCP should maintain radio contact and coordinate with the SLCPs and JLCC as required.



Senior Transportation Officer Qualification Course Lighterage - JLOTS

Key Points

The following key points were discussed:

- Lighterage Operations
- Responsibilities
- Operational Limitations
- Computing Lighterage Trunaround Time
- Lighter Requirements and Daily Tonnage Capabilities
- Maintenance
- Lighter Control









Senior Transportation Officer Qualification Course Lighterage - JLOTS

Quick Challenge



What are the lighterage operational limitations that have the greatest impact on a JLOTS operation?

Select all that apply and then select Submit.

- A. Water Depth
- B. Beach gradiant



C. Weather



D. Sea state





Senior Transportation Officer Qualification Course Lighterage - JLOTS

Lighterage Types and Operational Characteristics

The lighterage assets organic to JLOTS operations includes:

- Lighter Aboard Ship (LASH)
- Seabee barge (SEABEE) barges
- Commercial self-propelled and towed barges
- Army and Navy landing craft and causeway ferries

The type of lighters will be dependent on the weather, sea state, surf conditions, beach gradient, and characteristics of the loading and discharge sites.

Both landing craft and causeway ferries have navigational lights and can operate under conditions of reduced visibility, although they will require vectoring from the ship control centers.







THERE AFE THATS



Senior Transportation Officer Qualification Course Lighterage - JLOTS

The Logistics Support Vessels (LSVs) are the Army's largest powered watercraft, designed to carry up to 2,000 tons of cargo from strategic sealift ships to shore during operations. Logistics Support Vessel (LSV) missions include:

- Provides intra-theater line haul of cargo/equipment
- Tactical and sustained resupply to remote, undeveloped areas along coastlines/inland waterways
- Employs bow and stern ramps for RO/RO cargo, and a bow thruster to assist in beaching/beach extraction.
- Shallow draft allows transport of cargo from deep-draft ships to shore ports or areas too shallow for larger ships.
- Support to discharge and backload of ships in RO/RO or LOTS operations.
- Can self-deploy anywhere in the world.

Logistics Support Vessel

The Logistics Support Vessel transports cargo, ISO containers, and rolling stock throughout a theater of operations or within inter-theater routes not otherwise serviced by the Military Sealift Command (MSC).

LSV Detachments also assist in Roll On/Roll Off or Logistics-Over-The-Shore operations, particularly with ISO container handling equipment, vehicular and other over-sized or over-weight cargo.

PERSONNEL

Officer



Warrant Officer	Enlisted	Total
	0.0000000	Tariff and the

23

CAPABILITIES

31

- Is capable of self-sustainment for a period of 30-45 days with accommodations for a 31-member crew
- Transports 2,000 STs of cargo with a range of 6,500 nautical miles
- Receives and discharges cargo through a bow ramp or stern ramp
- Beaches with a 1:30 offshore gradient with a maximum of 900 STs of cargo
- Deck area of 10,500 square feet can transport 21 to 24 M1A1 main Battle Tanks
- Provides combat health service and food service support
- Is capable of self-delivery to a theater of operations and meets the requirements to transit the Panama and Suez canals

MISSION

To provide transportation for vehicles, containers, and/or general cargo to remote, underdeveloped areas along coastlines and inland waterways; to support unit deployments, relocations, and port to port operations; to assist in discharging and backloading ships in a RO/RO or LOTS operation; and provide cargo transportation along coastal main supply routes (MSR).



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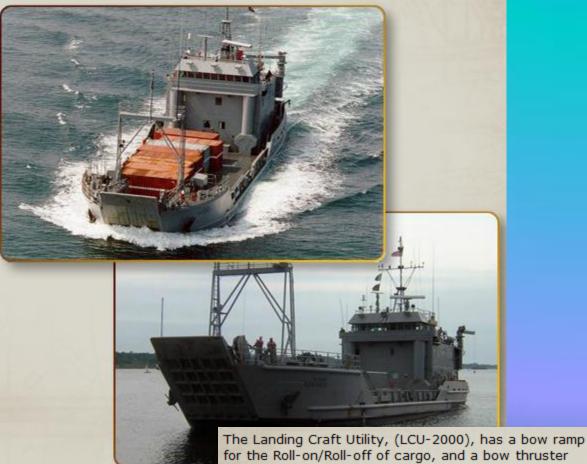
The Landing Craft, Utility 2000 (LCU-2000) moves containers, general, and vehicular cargo.

This vessel and crew perform missions in LOTS operations in remote areas with austere shore facilities or unimproved beaches.

The LCU-2000:

- Provides intra-theater movement of cargo and equipment.
- · Transports all tracked and wheeled vehicles, including main battle tanks, dozers, and material handling equipment, can be transported in LOTS operations.
- · Employs a bow ramp for RO/RO cargo, and a bow thruster to assist in beaching and beach extraction.
- · Navigates in shallow water. Because of its shallow draft, the LCU-2000 can carry cargo from deep draft ships to shore ports or areas too shallow for larger ships.

Landing Craft, Utility 2000



for the Roll-on/Roll-off of cargo, and a bow thruster to assist in beaching and beach extraction.

It can be self-deployed, or transported into a theater of operations aboard a Float On/Float Off vessel.



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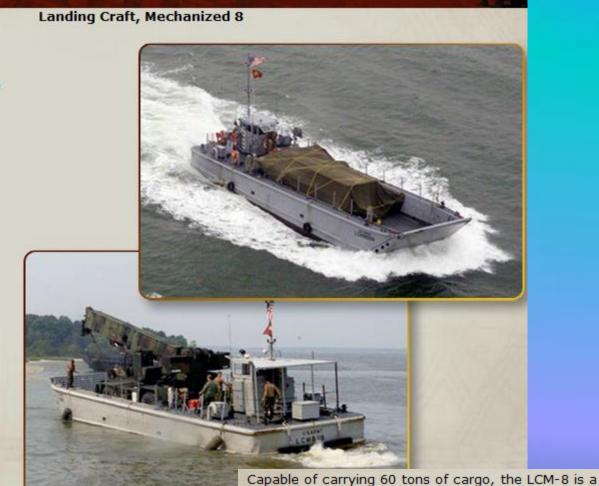
The Medium Watercraft Detachment, using the Landing Craft, Mechanized (LCM-8), transports cargo, troops, and vehicles from ship to shore or in a causeway operation, or retrograde movements.

It is also used:

- To transport cargo, troops, and vehicles from ship to shore or in retrograde movements.
- Do lighterage and utility work in harbors.
- For use in rough or exposed waters and is capable of operating through breakers and grounding on a beach.
- For RO/RO operations with wheeled vehicles using the bow ramp
- To operate in confined areas due to its small size

NOTE:

Weight restrictions on the LCM-8 preclude it from moving most common up-armored tracked vehicles (M1A1, M2, etc).



commander.

The LCM-8 may be attached to the U.S. Navy or Marine Corps to support joint amphibious, riverine or Logistics-Over-the-Shore (LOTS) operations.

highly versatile workhorse for the amphibious force



Senior Transportation Officer Qualification Course Lighterage - JLOTS

Modular Causeway System - RO/RO Discharge Facility

The Army's modular Roll-on/Roll-off Discharge Facility (RRDF) has no standard configuration. It is constructed with eight sections forming a rectangle and two sections end-to-end inboard and aft.

A sea end section is placed one string outboard of the end-toend sections. Fenders are placed along the outboard sides of the two end-to-end sections.

The "finger pier" configuration just described provides stable side mooring, keeps the lighter from getting under the ship's counter, and provides lighter masters more confidence when approaching and mooring.

Planners should know the calm water ramp is only compatible with the Navy Lighterage (NL) RRDF. Assembly time is approximately 6 to 8 hours.

The RRDF may be installed moored to a non-selfsustaining ship in sea state 0-1 and into a selfsustaining ship in sea state 0-2.

The RRDF can be safely operated through sea state 2. The sea current limitation on the system for installation and operation is 4 knots.

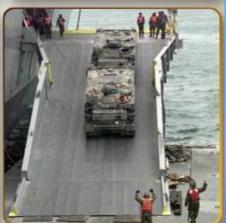
The principal elements of the RRDF are:

- · RO/RO Platform
- Ship Fendering System
- · Clam Water Ramp (CWR)









RO/RO Platform

The RO/RO platform is composed of six Navy or seven causeway section , nonpowered (CSNPs) to form the floating platform. The platform can be fender-moored to the ship by mooring lines or stand-off moored by using SLWTs.

The platform provides a base for the fender system and the free end of the ramp. It also serves as the interface roadway between the ramp and the lighterage, which will move the rolling stock ashore.

Ship Fendering System

The ship platform fendering system is composed of two foam-filled cylinders, a pivoting bearing structure, an adjustable webbed support structure, and a foundation frame with mounting pedestals.

Three fender systems are mounted at the shipward end of the transfer platform.

Clam Water Ramp

The CWR is 120 feet long and is composed of three 40-foot welded sections that are fastened together on the platform using pins at the bottom and bolts at the top.

The CWR is used for loading and unloading non-selfsustaining RO/RO ships. A 6,000-pound forklift should be available on the platform for materials handling before and during assembly.

Clear width between the side trusses is 14 feet and the ramp has a load capacity of 134,000 pounds. The maximum ramp operating angle is 15 degrees.

The ramp surface has a stud pattern and is painted with a textured coating to provide a high traction surface. The maximum sea state for a tank on the ramp is sea state 1.

The ramp is assembled and connected to the ship using the ship's existing hardware. The end adapter allows for relative motion between the ramp and platform independent of the movement of the ship.

Use of heavy dunnage is required to prevent wear and chafing between the ramp (either ship or RRDF) and the platform.



Senior Transportation Officer Qualification Course Lighterage - JLOTS

Modular Causeway System - Causeway Ferry

Causeway ferries are the most versatile of the lighterage capable of moving RO/RO cargo to the shore discharge points, where vehicles can be driven directly onto the beach.

Causeway ferries should be beached as close to beach egress routes as possible to facilitate rapid clearing and lessen beach deterioration.

Upon completion of vehicle unloading and retracting, as appropriate, bulldozers may be used to push the ferry seaward until all sections are afloat.

Causeway ferries operations are the most versatile of the lighterage operations.

They are capable of moving RO/RO cargo to the shore discharge points where vehicles can be driven directly onto the beach.







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Modular Causeway System - Floating Causeway

The Army's modular causeway system is similar to the NL causeway system. The modular causeway section (MCS) is the basic unit that comprises the Army's floating causeway systems.

MCSs are the building blocks that make up the MCS causeway ferry, RRDF, and the MCS floating causeway pier. MCS is comprised of:

- Nine separate modules; six 20foot end rake modules and three 40-foot quadrafloat modules.
- The end rakes are fully compatible with the Navy lighterage (NL) end rakes (P8M, P8F, P8C) in that the modular end rakes are right hand (402-MR), left hand (402-ML), and center (402-MC).
- Two end rakes are attached to a quadrafloat module (400) and these three modules are now called a "string." Three strings make up a MCS which is 80 feet long by 24 feet wide and 4.5 feet in depth (six inches less than an NL section).







HRRAGR - JLOYS



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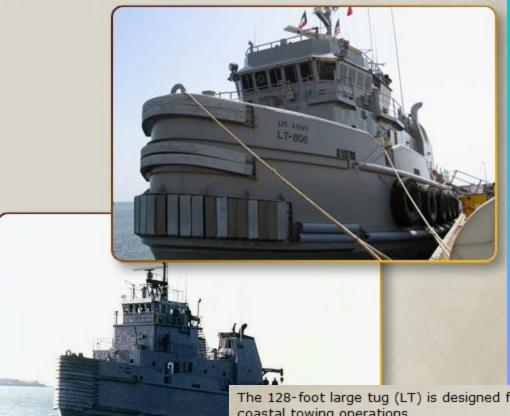
The 128-foot large tug (LT) is designed for ocean and coastal towing operations. LT missions include:

- Assisting bulk and special cargo ships to berth or anchorage
- Shuttling non-self propelled barges and other floating equipment from location to location during LOTS operations
- · Providing ocean, coastal and inland waterway tow service for Army logistic support

Characteristics and capabilities include:

- Self-deployable worldwide
- · Length overall: 128 feet
- · Beam (molded): 36 feet
- Displacement (weight): 786 LTONs (light); 1,057 LTONs (loaded)
- · Bollard pull: 58 tons
- · Range: 5,000 nautical miles at 13.5 knots (light); 5,000 nautical miles at 12 knots (loaded)
- Draft: 14.5 feet (light); 17 feet (loaded)

128-foot Large Tug



The 128-foot large tug (LT) is designed for ocean an coastal towing operations.

LT missions include: assisting bulk and special cargo ships to berth or anchorage; shuttling non-self propelled barges and other floating equipment from location to location during LOTS operations; and providing ocean, coastal, and inland waterway tow service for Army logistic support.

The LT is self-deployable worldwide.



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The small tug 900 (ST) is used to move non-propelled barges in harbors and on inland waterways.

Secondary missions include utility uses, fire fighting, salvage, and assisting in the docking and undocking of large vessels.

The characteristics of the vessel are as follows:

- · Length overall: 71 feet
- Beam: 19.5 feet
- Displacement (weight): Light -100 long tons, loaded - 122 long tons
- · Bollard pull: 8.75 tons
- Range: Light 1,700 nautical miles, loaded - variable depending on the tow configuration
- Draft: Light 7.5 feet, loaded -8.5 feet
- Crew Size: 2 WOs and 10 enlisted





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Barge Derrick Crane 115-Ton

The Barge Derrick (BD) Crane 115ton is used to load and discharge heavy lift cargo that is beyond the capacity of a normal ship's gear.

This provides the lift and reach needed to discharge the heaviest of projected Army cargo from LMSR's and commercial container ships to accomplish strategic deployment.

It is capable of lifting a 75-ton main battle tank from the centerline of a non self-sustaining ship. The BD 115ton is deployable worldwide by towing or heavy lift aboard a submersible heavy lift ship.

The characteristics of the vessel are as follows:

· Length overall: 200 feet

· Beam: 80 feet

. Boom length: 220 feet

• Capacity: 115 long tons at 80

foot radius

• Draft: Light - 7 feet, 4 inches

Crew size: 2 WOs and 13 enlisted







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The Army's SLWT is 85 feet long composed of a 40-foot section and two 20-foot raked ends which are configured into 80 foot by 24 foot sections.

It is low to the water and has a small pilothouse set off to one side. The SLWTs install floating causeways and RRDF. The SLWT is propelled by two Waterjet Propulsion Assemblies.

The swiveling heads on its two waterjet propulsion units make it more maneuverable than it looks, and in favorable seas a good coxswain can move the floating causeway sections around with relative ease.

The SLWTs install ELCAS and perform a wide variety of other functions such as powering causeway ferries, emplacing anchors, installing ship-to-shore bulk fuel transfer systems, and performing surf salvage.

Side Loadable Warping Tugs





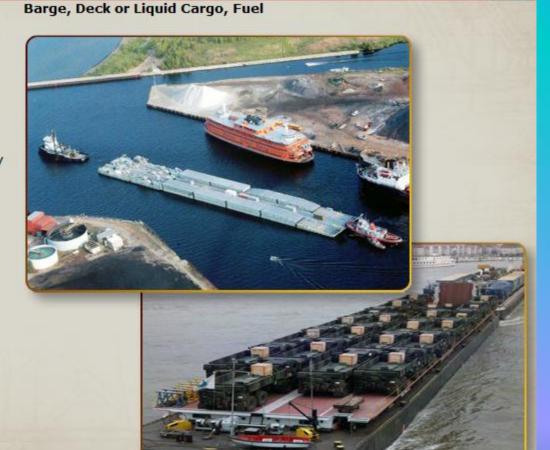
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The Barge, deck or liquid cargo, BG 231 (fuel) transports liquid or general cargo in harbors and inland waters from off-shore tankers to shore facilities. The BG 231 can also serve as an operational area refueling point.

The barge is equipped with two skegs aft; this improves its towing capability by helping to keep it tracking on course.

It can be towed overseas or deckloaded aboard a Heavy-Lift Prepositioning Ship (HLPS). Characteristics and capabilities include:

- Length overall: 120 feet
- Beam: 33 feet
- Displacement (weight): 185 LTONs (light); 763 LTONs (loaded)
- Cargo capacity: deck, 578 LTONs; liquid, 4,160 barrels (188,416 gallons)
- Cargo pump capacity: 1,050 gallons per minute
- Draft: 3 feet (light); 9 feet (loaded)





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The Joint High Speed Vessel (JHSV) is employed to move, maneuver, and reposition personnel, cargo, and equipment during intratheater lift, waterborne tactical and joint amphibious or riverine operations.

The JHVS supports the full spectrum of military operations by providing the ability to bypass degraded lines of communication, shorten MSRs, and conduct tactical operations from offshore and remote bases.

The JHSV supports the Commander in Chief's (CINC's) ability to build and sustain combat power by giving combat teams access to a wide variety of access points in remote and austere theaters of operation.

Joint High Speed Vessel





MISSION

To perform high-speed waterborne transportation of personnel, cargo, and equipment, including fully operational combat teams, during intratheater lift, waterborne tactical and joint amphibious or, riverine operations.

	PERSONNEL		
Officer	Warrant Officer	Enlisted	Total
0	8	23	31

CAPABILITIES

- Self-sustainment for a period of 30-45 days with accommodations for the crew.
- Transports 1250 STONs of unit equipment or sustainment supplies, and 360 combat equipped troops in a single lift. This equates to a Force XXI Armor or Mechanized Infantry company.
- Echelon one combat health and food service support.
- Self-delivery to a theater of operations and ability to transit the Panama and Suez Canals.



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Key Points

The following key points were discussed:

- Lighterage Types and Operational Characteristics
- Logistics Support Vessel (LSV)
- . Landing Craft, Utility 2000 (LCU-2000
- Landing Craft, Mechanized 8 (LCM-8)
- Modular Causeway System (RO/RO Discharge Facility)
- Modular Causeway System (Causeway Ferry)
- Modular Causeway System (Floating Causeway)
- 128-foot large tug (LT)
- Small Tug 900 (ST)
- · Barge Derrick (BD) Crane 115-Ton
- Side Loadable Warping Tugs
- Barge, Deck or Liquid Cargo, Fuel (BG)
- Joint High Speed Vessel (JHSV)









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Quick Challenge



Which vessel provides intra-theater line haul of large quantities of cargo and equipment?

Select the best answer and then select Submit.

- A. Landing Craft, Utility 2000 (LCU-2000)
- B. Modular Causeway System (Causeway Ferry)
- C. Side Loadable Warping Tugs



- D. Logistics Support Vessel (LSV)
- E. Barge, Deck or Liquid Cargo, Fuel (BG)



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Quick Challenge



Which vessel would you use to move a 75 ton main battle tank from the centerline of a non selfsustaining ship?

Select the best answer and then select Submit.

- A. Landing Craft, Utility 2000 (LCU-2000)
- B. Modular Causeway System (Causeway Ferry)
- C. Side Loadable Warping Tugs
- D. Barge, Deck or Liquid Cargo, Fuel (BG)



E. Barge Derrick (BD) Crane 115 Ton





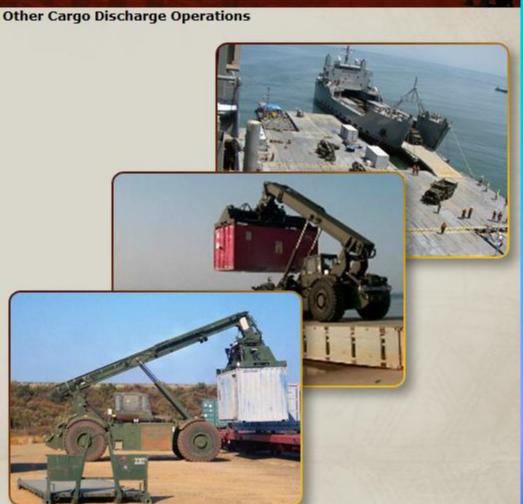
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The mission to conduct cargo discharge operations includes the interfacing of transportation modes in the surf zone, seaward of the surf line and on the beach.

Although most RO/RO transported equipment can be driven off ship-to-shore lighterage, other dry cargoes are discharged by specialized off-load equipment and either placed on a land vehicle for further transport or carried directly to an appropriate area.

Such transfers can be accomplished at the beach or onto a platform that is connected with a beach.

Air cushioned watercraft and amphibians, on the other hand, are capable of transporting cargo directly to a marshalling area, thus eliminating a transfer at the shoreline.





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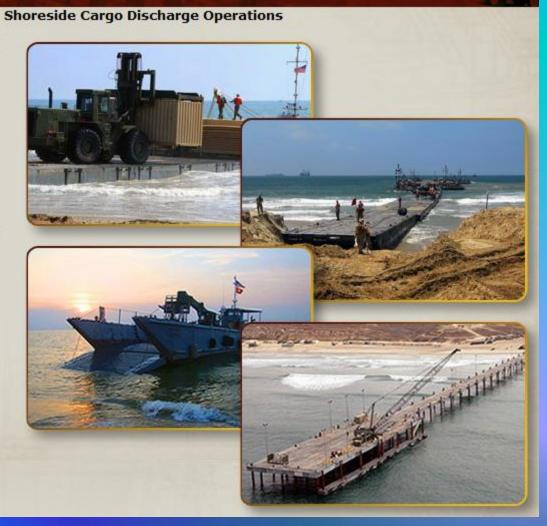
Shoreside cargo discharge operations are both mission and Service support dependent.

Both the Army and Navy have their own lighterage assets and shoreside discharge systems. Their capabilities vary with the discharge systems employed.

These systems should complement ship off-load systems so there will be sufficient over-the-shore throughput capability to match ship discharge rates.

These systems include:

- Elevated Causeway System (ELCAS)
- Floating Causeway Pier operations (CWPs)
- Amphibian Operations
- Bare Beach Operations
- Liquid Cargo Operations





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Amphibian Operation

There are currently two types of amphibians in the Army's inventory.

They are:

- Air Cushion Vehicles
- Wheeled Amphibians

Air Cushion Vehicles

The Navy's LCAC is used primarily as an amphibious assault vehicle. The LCAC can also be employed in JLOTS operations.

Wheeled Amphibians

Wheeled amphibians will normally be employed to carry breakbulk cargo, containers, or bulky and outsized wheeled and tracked vehicles.

The current Army wheeled amphibian, the LARC-LX, presents problems because of its size and the angle of its vehicle ramp.

Some vehicles cannot climb the ramp, and beach personnel should confirm this ability to avoid damaging engines and transmissions.

Damage can be avoided by building a sand ramp or berm to reduce the LARC's ramp angle. Amphibian parks are required for maintenance of craft and holding craft not immediately needed for the operation.

They will be located on firm trafficable soil, close enough to the operating site to allow the amphibians to move to or from the beach on call. The area must allow enough room for dispersion and concealment.











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The extent of operations on a bare beach is dependent on:

- Beach gradient and characteristics
- Weather
- Wave height and characteristics
- Beach consistency
- . Type of cargo transiting the beach

Since cargo is off-loaded in the surf zone, particular care must be taken with some cargoes to ensure protection from wetness, weather, damage, and being stalled because of lack of traction.

Wet landings, however, may not be permissible for vehicles, supplies, and equipment not specifically waterproofed.

Equipment used in Bare Beach Operations is:

- Rough Terrain Container Handler (RTCH)
- Roll-on/Roll-off lighterage (RO/RO)
- Rough Terrain Forklift (RT)

Rough Terrain Container Handler

Specialized equipment (RTCHs or RTCC) is used to discharge containers from beached causeway ferries and double-wide modular causeway ferries (DWMCFs).

The RTCH is the most efficient method of off-loading causeway ferries. They pick the container up while on the ferry and place it aboard the container trailer ashore, eliminating double handling on the beach.

Bare Beach Operations

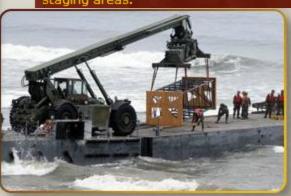




Rough Terrain Forklift

Breakbulk cargo is normally discharged to the beach by an RT forklift. Trucks, tractor trailers, or rough terrain forklift trucks will be required to move breakbulk cargo from beach discharge points to staging areas.





Roll-on/Roll-off lighterage

RO/RO cargo is simply driven or towed off the lighterage on to the beach to a staging area.



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Liquid cargo operations may be viewed in three distinct increments:

- Ocean transport of liquid cargo from origin to offshore locations in the AOR.
- Cargo transfer operations from offshore to the high water mark.
- Beach storage and/or distribution area operations.





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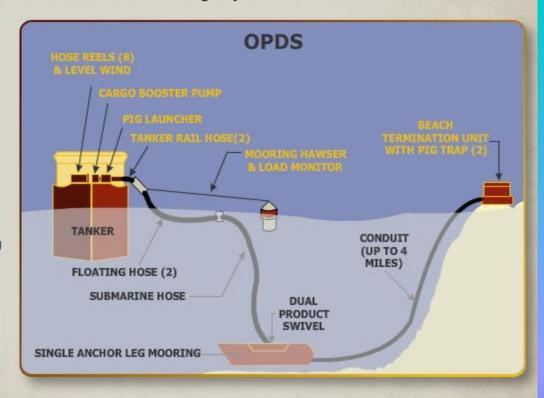
The Offshore Petroleum Discharge System (OPDS) was designed to provide the Service components in an operational area with large volumes of refined petroleum products over a sustained period.

The OPDS consists of two major components: a specially configured product tanker and a mobile tanker terminal.

Each OPDS tanker carries one complete tanker terminal, including outfitting for side loadable warping tug (SLWTs) to deploy it.

Two of the tankers, Chesapeake and Petersburg, also have a 59 LT capacity crane to load/off-load five OPDS Utility Boats (OUBs) carried on board, fully outfitted and configured to perform all SLWT functions, and provide these tankers with full capability for OPDS deployment.

Offshore Petroleum Discharge System





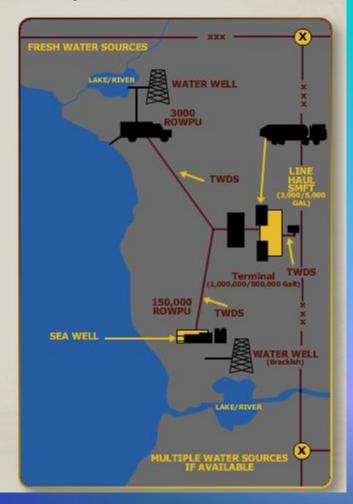
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Certain scenarios, particularly arid environment operations, may require the delivery of bulk potable water to storage and distribution systems ashore.

The water-on-shore storage and distribution systems will consist of at least one 800,000-gallon system (or appropriate segment) operated by a quartermaster (QM) water supply company.

Water can then be moved away from the beach with a Tactical Water Distribution System (TWDS) and/or semitrailer-mounted fabric tanks.

Tactical Water Systems





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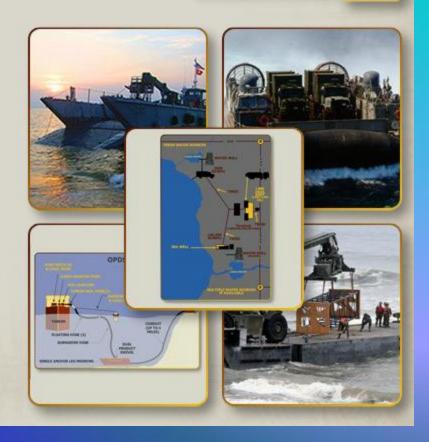
Key Points

The following key points were discussed:

- Shoreside Cargo Discharge Operations
- Amphibian Operation
- · Bare Beach Operations
- Liquid Cargo Offshore Operations
- · Petroleum Discharge System
- Tactical Water Systems









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Quick Challenge



What factors affect a bare beach operation?

Select all that apply and then select Submit.



A. Beach gradient and characteristics



B. Weather



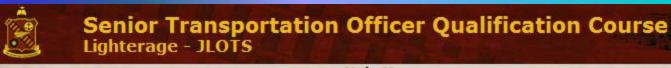
C. Wave height and characteristics



D. Beach consistency



E. Type of cargo transiting the beach







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Beach and Port Clearance and Marshalling Operations

The ability to clear cargo from a beach depends upon the physical features of the beach, weather, oceanographic features, the tactical situation, and the organization and equipment of the beach clearance units (BCUs) assigned to the operations.

To obtain beach throughput effectiveness, clearance units must reach and maintain maximum transfer and clearance rates.

Beach throughput is dependent on:

- Receipt Capability
- Transfer Rate
- Clearance Rates

Receipt Capability

The receipt capability is based on the availability of discharge points such as causeway ferries, amphibian exit points, splash points of landing craft utility (LCUs), and logistics support vessel (LSVs).

Transfer Rate

The transfer rate is the rate cargo is unloaded from lighters.

Beach transfer begins when the crane or MHE connects and begins lifting the cargo from the deck of the lighter and ends when the cargo is placed on a transport vehicle.

In the case of amphibian vessels, transfer begins when the vessels exit the water en route to the cargo and container marshalling yard.

In the case of wheeled vehicles, transfer begins when the vehicle starts moving from the lighter deck and ends when it is clear of the beach.



Clearance Rates

The clearance rate is the rate at which cargo is moved from beach transfer points to staging and marshalling areas.

Throughput is a major consideration to effective JLOTS operational productivity.

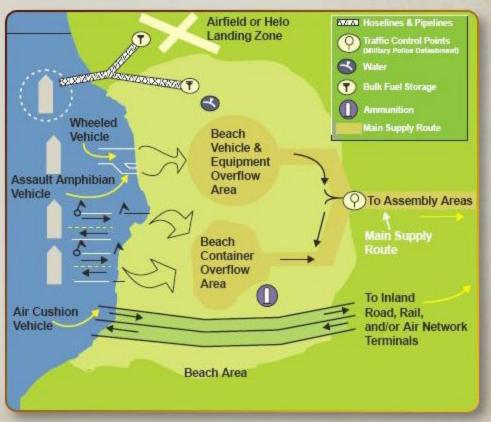


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Within the beach area, locations must be established and clearly marked for:

- Lighter and amphibian vehicle landing sites
- · Staging and loading area
- · Bulk fuel and water storage
- Class V dumps
- · Beach operational support areas

Beach Area Organization



Lighter and Amphibian Vehicle Landing Sites

Vehicle traffic routes and air cushion vehicles (ACV) routes connecting landing sites, staging areas, and dumps must be selected and clearly marked.

One-way traffic patterns should be established whenever possible. Amphibian vehicle landing sites should be located on one flank of the beach.

Staging and Loading Area

With more military ocean-going cargo now being containerized, facilities must be provided to store containers temporarily after they are discharged from lighterage and to prepare them for onward movement.

A marshalling area is provided for this purpose and it is similar to a fixed-port container transfer facility.

However, in addition to the space for storing containers temporarily, the area must have space and facilities for repacking and repairing the containers and for performing any other operational or administrative functions required to marshal them.

In-transit storage areas are used to temporarily store cargo requiring further transportation to units or depots. In-transit storage areas should not become depots.

Only cargo awaiting clearance transportation should be stored in these areas, not cargo awaiting issue for use.

Bulk Fuel and Water Storage

Landward water systems, amphibious assault, and inland distribution petroleum fuel systems, including connecting lines, must be considered when preparing for beach transfer and clearance operations.

Construction of a road network, berms, and pads for bag farms must be coordinated with the engineers.

Class V Dumps

Class V landing sites and dumps should be located on the opposite flank from the vehicle, air cushion vehicle, and amphibian landing sites.

Temporary storage facilities must be provided in order to segregate ammunition from other cargo.

Beach Operational Support Areas

Billeting, messing, maintenance, services, C2, and other support areas must be established to support the JLOTS operation.



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The marshalling area, a large inland staging area, is one key to continuous throughput. Distance from the beach and road network, drainage, and soil conditions should be considered in the selection area.

Engineers should evaluate soil and weather conditions to determine requirements for soil stabilization.

The staging or marshalling area is operated by a BCU and is organized into:

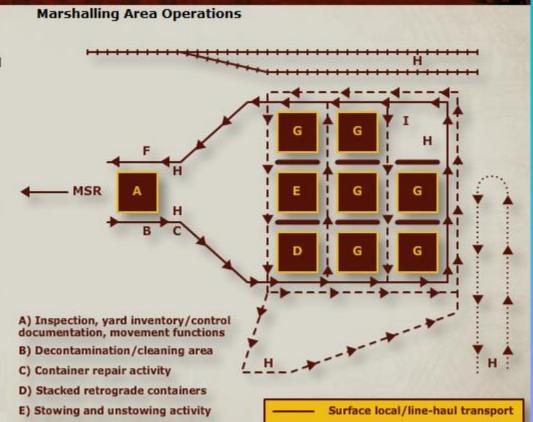
- Holding Areas
- Loading Areas

Containers, vehicles, and equipment moving off the beaches to the staging or marshalling area are identified and documented by the documentation detachment and clearance unit. Each load is then directed to a proper holding or loading area.

Holding Area

The holding areas are used to stage containers, vehicles, and equipment pending transportation to dumps or issue points. Additionally, a holding area is established for empty containers waiting retrograde.

If the road network and traffic flow permit and the staging area is large enough, the holding areas for containers and vehicles or equipment may also be used as holding points.



Beach/marshaling area transport

Amphibian transport

Rail spur

Side loader/front loader

Loading Area

H) Cargo checkers

I) Helicopter landing pad

The loading areas are located near beach and staging and/or marshalling area exits to load and document cargo for transportation inland to the operational area.

F) Equipment maintenance and parking

G) Stacked inbound containers



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Port Operations

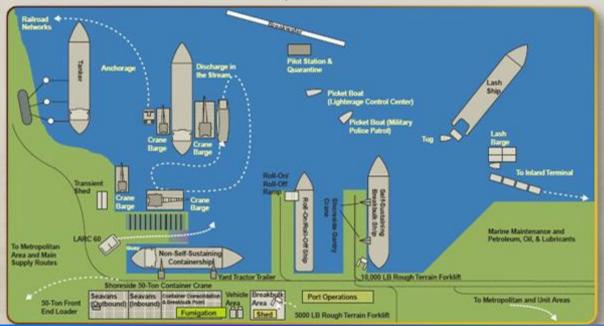
JLOTS operations may be conducted in fixed ports. The port operations organization is responsible for the port facilities and the throughput of supplies and equipment as they are off-loaded from the ships.

The port operations organization operates under the overall direction of the JLOTS commander in coordination with the ship's lighterage control point (LCP) or debarkation officer.

Specifically, the port operations organization is responsible for the following tasks:

- · Piers and overflow areas of cargo
- · Liaison with host-nation port authorities
- · MHE

- · Ship off-load
- Security
- · Port Operations
- · Bulk fuel or water reception and transfer facilities
- · Air cushion vehicle routes



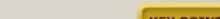


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Key Points

The following key points were discussed:

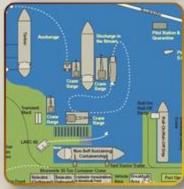
- Beach and Port Clearance and Marshalling Operations
- Beach Area Organization
- Marshalling Area Operations
- Port Operations

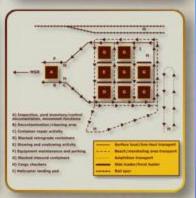


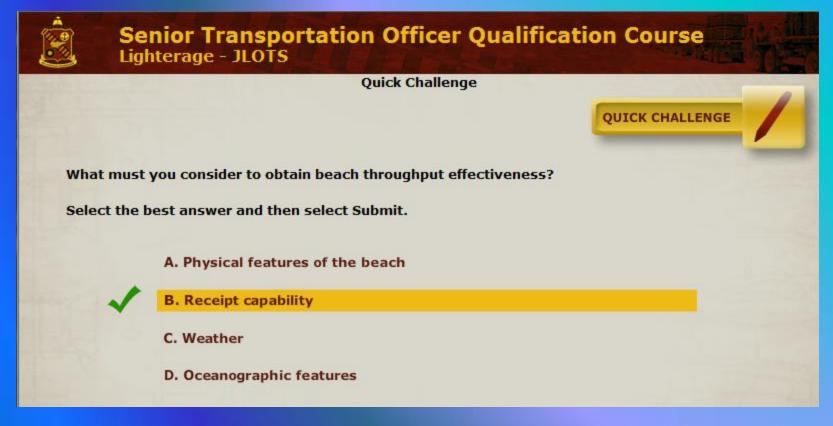












This is one of the factors with the other two as receipt capability and clearance rate. Beach thru put effectiveness really depends on maintaining maximum clearance and transfer rates. This is not a good question.



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Quick Challenge



When JLOTS operations are conducted at a fixed port, which of the following is the JLOTS commander responsible for?

Select all that apply and then select Submit.



A. Piers and overflow areas of cargo



B. Liaison with host-nation port authorities



C. Security



D. Air cushion vehicle routes



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Summary

In this lesson, we have discussed: JLOTS Operations, Ship Discharge Operations, Lighterage Operations, Lighterage Types and Operational Characteristics, Other Cargo Discharge Operations, and Beach and Port Clearance and Marshalling Operations.

All of these functions contribute to a successful JLOTS operation.

An efficient JLOTS operations is part of the total deployment process, and as a Senior Transportation or Logistics Officer, you must understand the impact that the JLOTS operation has on the overall mission accomplishment.

Today's operational environments demand flexible and fluid transportation support procedures and functional relationships to sustain U.S. and coalition forces.

Your understanding of the responsibilities and activities involved with JLOTS operations and its role in mission accomplishment will contribute to satisfying the combatant commander's intent.

An efficient JLOTS operation gives the supported combatant commander the necessary supplies and equipment to complete the assigned mission.

